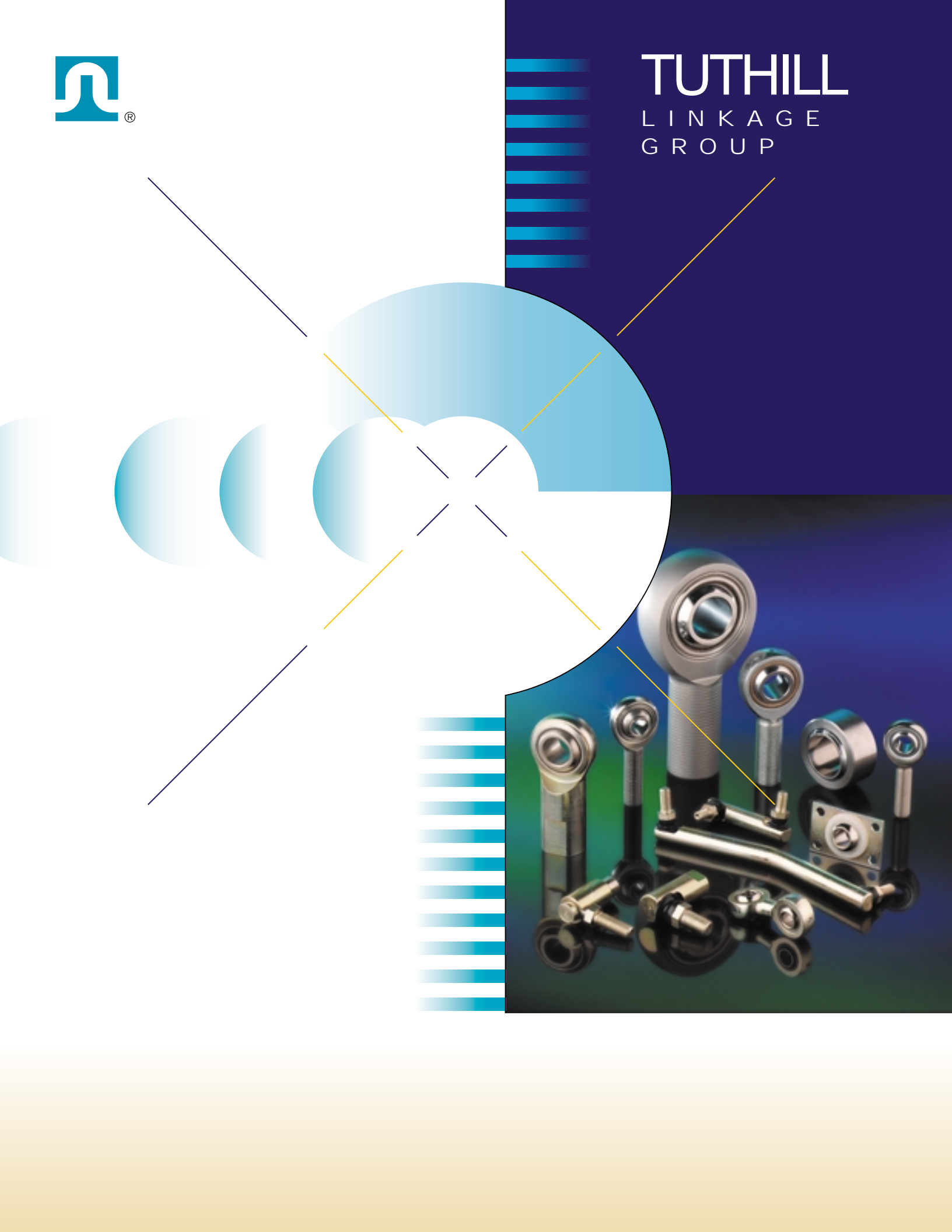




TUTHILL

LINKAGE
GROUP





Introduction

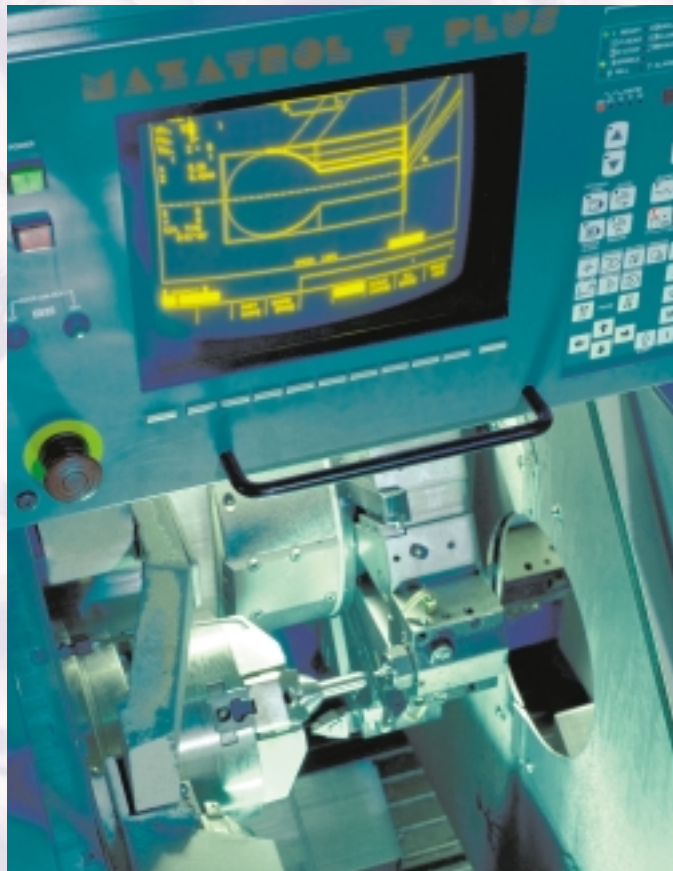


Tuthill Linkage Group (TLG)

is one of the world's leading producers of rod ends, spherical bearings, ball joints, linkage assemblies and mechanical control components. Through diversification, strategic acquisitions, and internal growth, Tuthill Linkage Group has evolved into a multinational manufacturing and marketing organization with four manufacturing facilities in the United States and the United Kingdom. Sales offices and branches are strategically located around the globe.

TLG manufactures a wide range of linkage solutions through its four product companies: Superior Linkage, J.J. Tourek, National Rod Ends, and Tuthill Controls Ltd. With over 125 years of combined manufacturing experience, together they produce rod ends, ball joints, spherical bearings and linkages for an equally wide variety of applications. From agriculture to transportation, from racing cars to lawn and garden equipment, and from construction equipment to printing machinery TLG can provide cost effective, performance engineered solutions to the most demanding motion transfer needs. You may also visit our web site at www.tuthill.com.

Elk Grove Village, IL





Mendota Heights, MN



New Haven, IN



Reading, UK



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 Inches

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*A trademark of E.I. DuPont de Nemours & Co., Inc.

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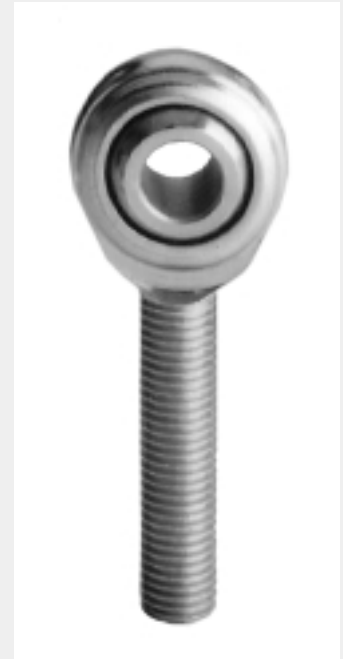
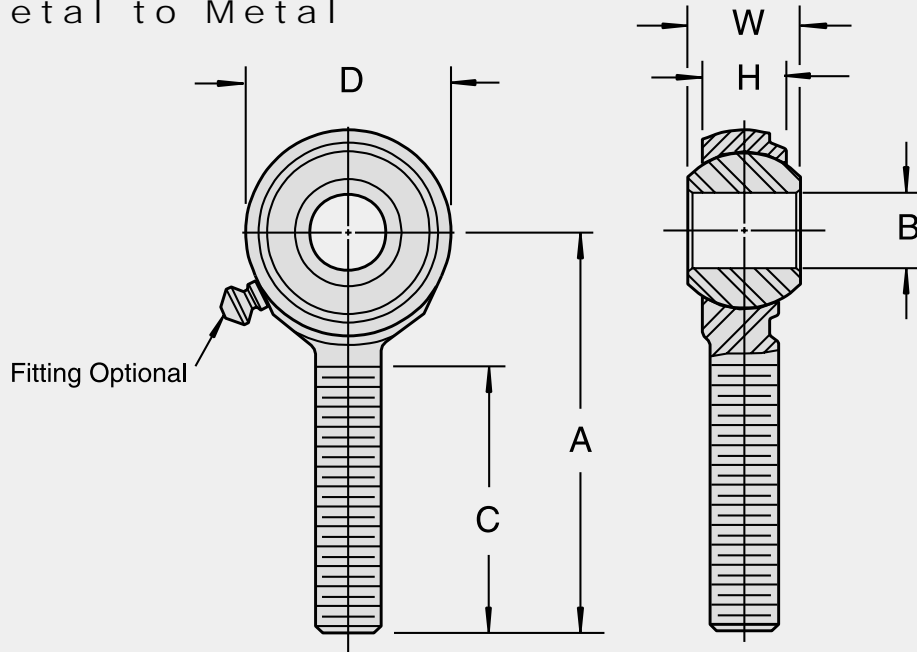
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*A trademark of E.I. DuPont de Nemours & Co., Inc.

EM

Commercial, 2-Piece
Metal to Metal



Part Number		B <small>+0.0020 -0.0000</small>	W <small>±.005</small>	H <small>REF</small>	A <small>+0.062 -0.031</small>	D <small>±.015</small>	REF	C <small>±.060</small>	UNF-2A	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
EM4	EML4	.2500	.375	.281	1.562	.750	.516	1.000	1/4-28	2,510	.043
EM5	EML5	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	3,430	.073
EM6	EML6	.3750	.500	.406	1.937	1.000	.719	1.250	3/8-24	5,520	.110
EM8	EML8	.5000	.625	.500	2.437	1.312	.938	1.500	1/2-20	8,690	.240
EM10	EML10	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	10,300	.368

MATERIALS

Ball

Low Carbon Steel
Case Hardened
Zinc Plated, Yellow
Dichromate Treated

Body

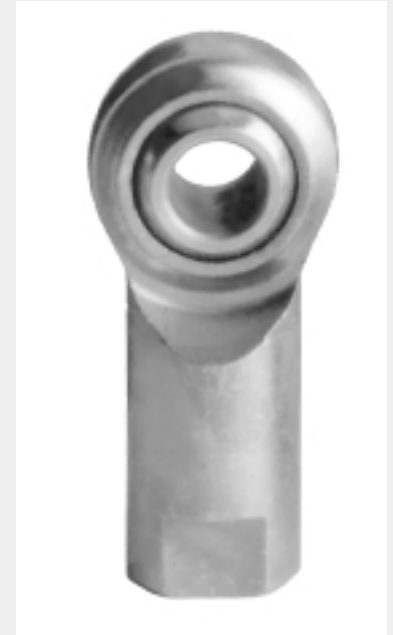
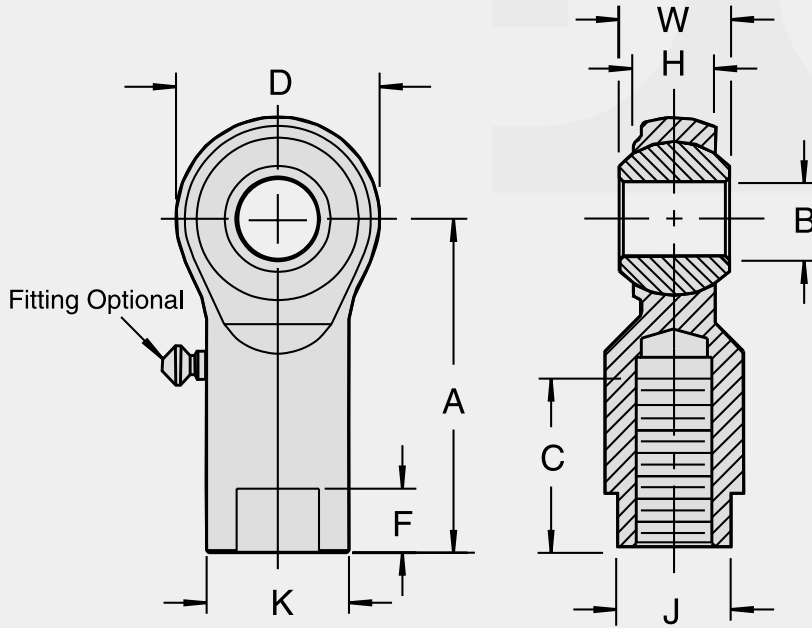
Low Carbon Steel
Zinc Plated, Yellow
Dichromate Treated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix.
Example: EM8Z
- This series is also available in a studded configuration.
(Refer to chart in this catalog on page 66).
Specify by adding "S" to suffix.
Example: EM8S

EF

Commercial, 2-Piece
Metal to Metal



Part Number		B +0.0020 -0.0000	W ±.005	H REF	A +0.062 -0.031	D ±.015	K ±.015	J ±.015	F ±.030	REF	C ±.060	UNF-2B	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Wrench Flat Length	Ball Diameter	Thread Length	Thread Size		
EF4	EFL4	.2500	.375	.281	1.312	.750	.469	.375	.250	.516	.687	1/4-28	3,470	.062
EF5	EFL5	.3125	.437	.344	1.375	.875	.500	.437	.281	.625	.687	5/16-24	4,680	.081
EF6	EFL6	.3750	.500	.406	1.625	1.000	.687	.562	.312	.719	.812	3/8-24	5,520	.152
EF8	EFL8	.5000	.625	.500	2.125	1.312	.875	.750	.375	.938	1.187	1/2-20	9,460	.324
EF10	EFL10	.6250	.750	.562	2.500	1.500	1.000	.875	.500	1.125	1.406	5/8-18	10,300	.473

MATERIALS

Ball

Low Carbon Steel
Case Hardened
Zinc Plated, Yellow
Dichromate Treated

Body

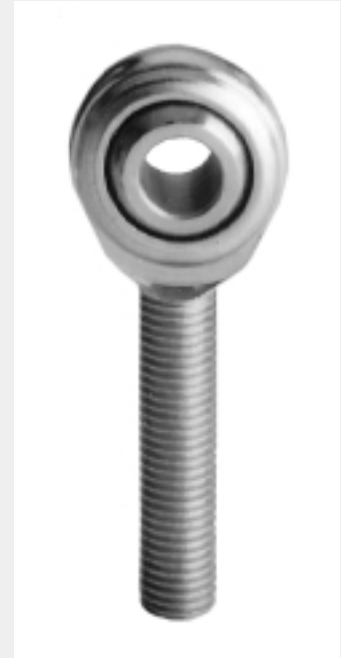
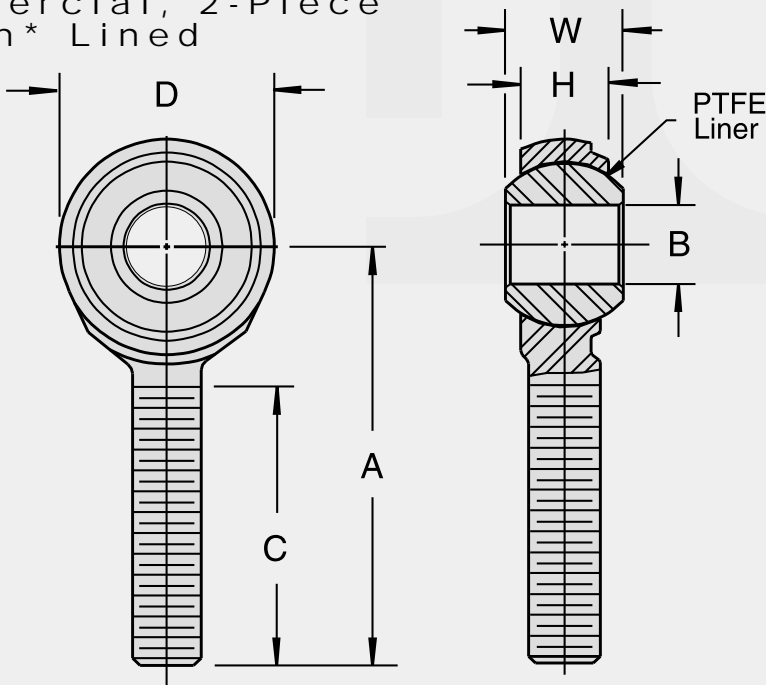
Low Carbon Steel
Zinc Plated, Yellow
Dichromate Treated

NOTES:

- For standard zerk lubrication fitting add "Z" to suffix.
Example: EF8Z
- This series is also available in a studed configuration.
(Refer to chart in this catalog on page 66).
Specify by adding "S" to suffix.
Example: EF8S

EM-T

Commercial, 2-Piece
Teflon* Lined



Part Number		B <small>+0.0020 -0.0000</small>	W <small>±.005</small>	H <small>REF</small>	A <small>+0.062 -0.031</small>	D <small>±.015</small>	REF	C <small>±.060</small>	UNF-2A	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
EM4T	EML4T	.2500	.375	.281	1.562	.750	.516	1.000	1/4-28	2400	.042
EM5T	EML5T	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	3100	.071
EM6T	EML6T	.3750	.500	.406	1.937	1.000	.719	1.250	3/8-24	3800	.108
EM8T	EML8T	.5000	.625	.500	2.437	1.312	.938	1.500	1/2-20	7900	.237
EM10T	EML10T	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	8300	.365

MATERIALS		
Ball	Body	Liner
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	PTFE Bonded to Body I.D.

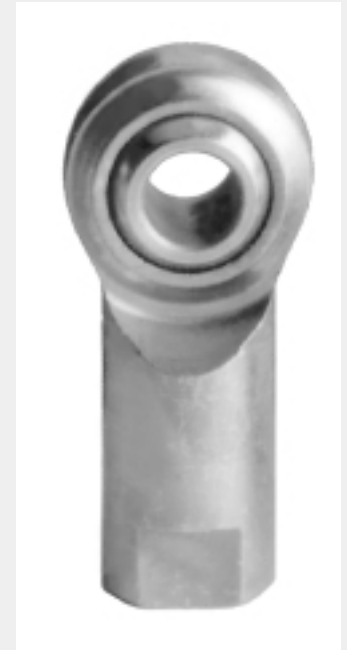
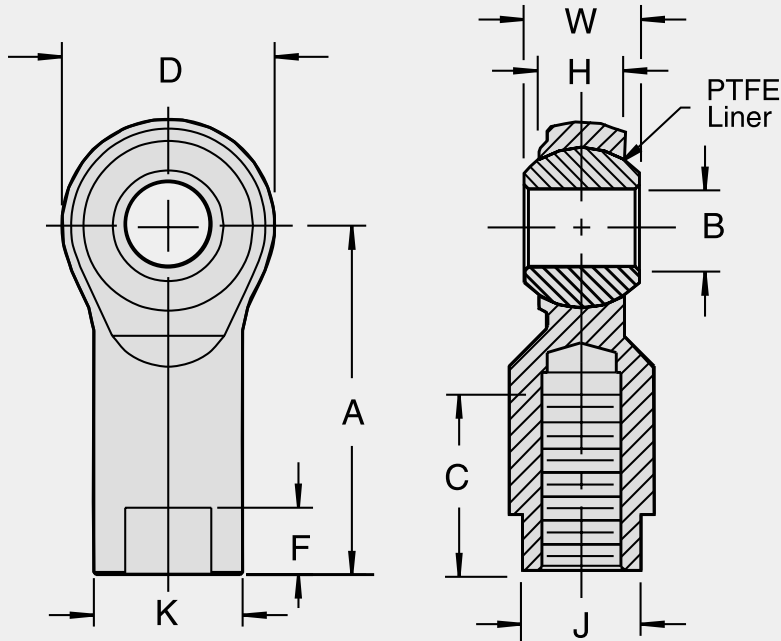
- NOTES:
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: EM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.



EF-T

Commercial, 2-Piece
Teflon* Lined



Part Number		B +0.020 -0.000	W ±.005	H REF	A +0.062 -0.031	D ±.015	K ±.015	J ±.015	F ±.030	REF	C ±.060	UNF-2B	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Wrench Flat Length	Ball Diameter	Thread Length	Thread Size		
EF4T	EFL4T	.2500	.375	.281	1.312	.750	.469	.375	.250	.516	.687	1/4-28	2700	.059
EF5T	EFL5T	.3125	.437	.344	1.375	.875	.500	.437	.281	.625	.687	5/16-24	3900	.079
EF6T	EFL6T	.3750	.500	.406	1.625	1.000	.687	.562	.312	.719	.812	3/8-24	4600	.151
EF8T	EFL8T	.5000	.625	.500	2.125	1.312	.875	.750	.375	.938	1.187	1/2-20	8500	.320
EF10T	EFL10T	.6250	.750	.562	2.500	1.500	1.000	.875	.500	1.125	1.406	5/8-18	8900	.465

MATERIALS

Ball	Body	Liner
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	PTFE Bonded to Body I.D.

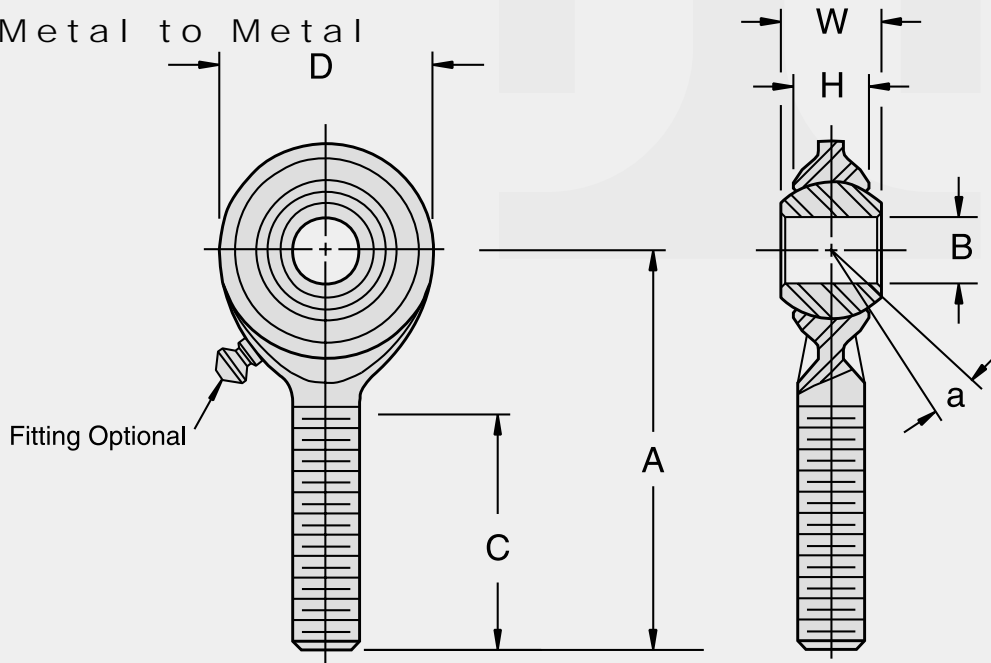
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: EF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MSM

Precision, 2-Piece,
Metal to Metal



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H REF	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSM3*	MSML3*	.1900	.312	.234	1.250	.625	.437	.750	10-32	17	1,170	.03
MSM4*	MSML4*	.2500	.375	.250	1.562	.750	.500	1.000	1/4-28	21	2,157	.04
MSM5*	MSML5*	.3125	.437	.312	1.875	.875	.625	1.250	5/16-24	17	3,469	.07
MSM6	MSML6	.3750	.500	.359	1.938	1.000	.719	1.250	3/8-24	19	4,916	.11
MSM7	MSML7	.4375	.562	.406	2.125	1.125	.812	1.375	7/16-20	18	6,162	.15
MSM8	MSML8	.5000	.625	.453	2.438	1.312	.937	1.500	1/2-20	17	8,075	.24
MSM10	MSML10	.6250	.750	.484	2.625	1.500	1.125	1.625	5/8-18	22	9,509	.36
MSM12	MSML12	.7500	.875	.593	2.875	1.750	1.312	1.750	3/4-16	18	13,831	.57

MATERIALS

Ball

52100 Steel
Rc 56 Min.
Hard Chrome Plated

Body

Low Carbon Steel
Zinc Plated
Clear Chromate Treated

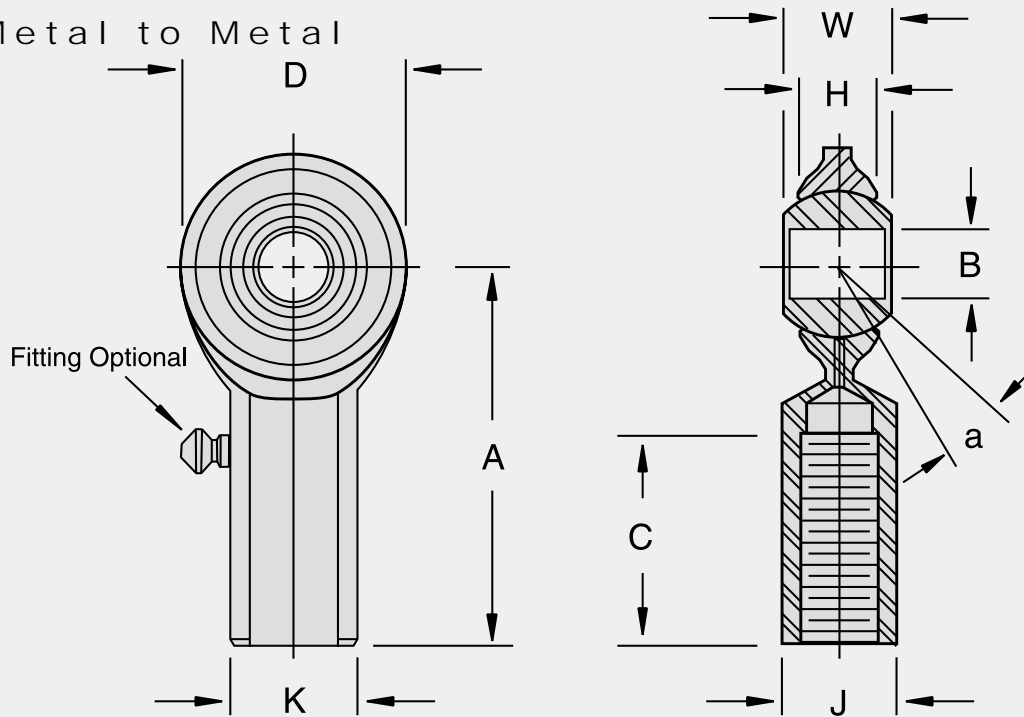
NOTES:

- For standard zerklubrication fitting add "Z" to suffix.
Example: MSM8Z
- This series is also available in a studded configuration.
(Refer to chart on page 66). Specify by adding "S" to suffix.
Example: MSM8S

*Lubrication fittings are not supplied on these units

MSF

Precision, 2-Piece,
Metal to Metal



Part Number		B +0.025 -0.005	W +0.000 -0.005	H REF	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +0.062 -0.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSF3*	MSFL3*	.1900	.312	.234	1.062	.625	.406	.312	.437	.500	10-32	17	2,028	.04
MSF4	MSFL4	.2500	.375	.250	1.312	.750	.469	.375	.500	.687	1/4-28	21	3,114	.05
MSF5	MSFL5	.3125	.437	.312	1.375	.875	.500	.437	.625	.687	5/16-24	17	3,721	.08
MSF6	MSFL6	.3750	.500	.359	1.625	1.000	.687	.562	.719	.812	3/8-24	19	4,929	.13
MSF7	MSFL7	.4375	.562	.406	1.812	1.125	.750	.625	.812	.937	7/16-20	18	6,215	.18
MSF8	MSFL8	.5000	.625	.453	2.125	1.312	.875	.750	.937	1.062	1/2-20	17	8,779	.29
MSF10	MSFL10	.6250	.750	.484	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	22	9,509	.43
MSF12	MSFL12	.7500	.875	.593	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	18	13,831	.65

MATERIALS

Ball

52100 Steel
Rc 56 Min.
Hard Chrome Plated

Body

Low Carbon Steel
Zinc Plated
Clear Chromate Treated

NOTES:

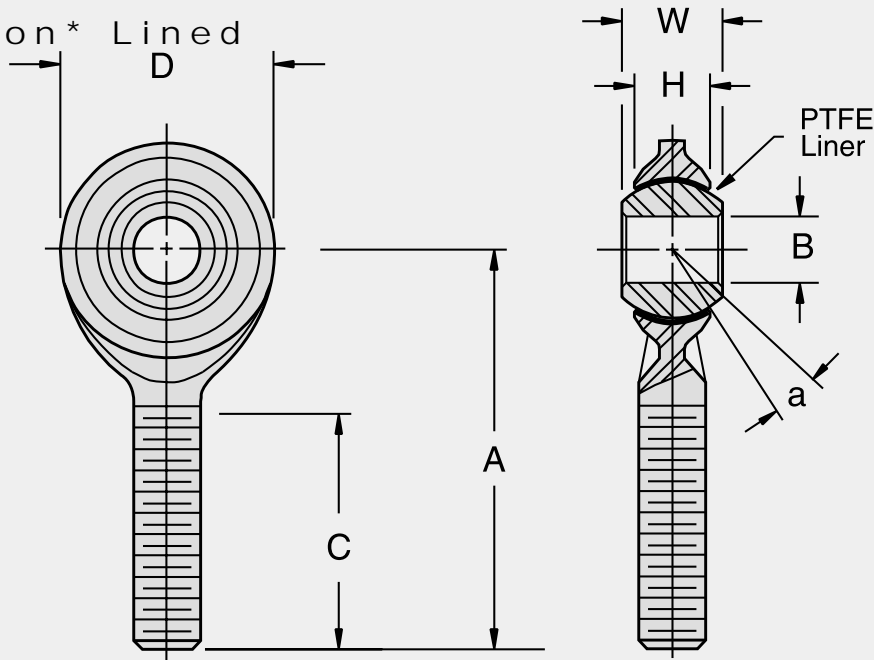
1. For standard zerklubrication fitting add "Z" to suffix.
Example: MSF8Z
2. This series is also available in a studded configuration.
(Refer to chart on page 66). Specify by adding "S" to suffix.
Example: MSF8S

*Lubrication fittings are not supplied on these units

MSM-T

Precision, 2-Piece,

Teflon* Lined



Part Number		B +.0025 -.0005	W +.000 -.005	H REF	A +.015	D ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSM3T	MSML3T	.1900	.312	.234	1.250	.625	.437	.750	10-32	17	894	.03
MSM4T	MSML4T	.2500	.375	.250	1.562	.750	.500	1.000	1/4-28	21	1,792	.04
MSM5T	MSML5T	.3125	.437	.312	1.875	.875	.625	1.250	5/16-24	17	2,844	.07
MSM6T	MSML6T	.3750	.500	.359	1.938	1.000	.719	1.250	3/8-24	19	4,124	.11
MSM7T	MSML7T	.4375	.562	.406	2.125	1.125	.812	1.375	7/16-20	18	5,262	.15
MSM8T	MSML8T	.5000	.625	.453	2.438	1.312	.875	1.500	1/2-20	17	7,106	.24
MSM10T	MSML10T	.6250	.750	.484	2.625	1.500	1.062	1.625	5/8-18	22	8,282	.36
MSM12T	MSML12T	.7500	.875	.593	2.875	1.750	1.250	1.750	3/4-16	18	12,295	.57

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Permanently bonded to body I.D.

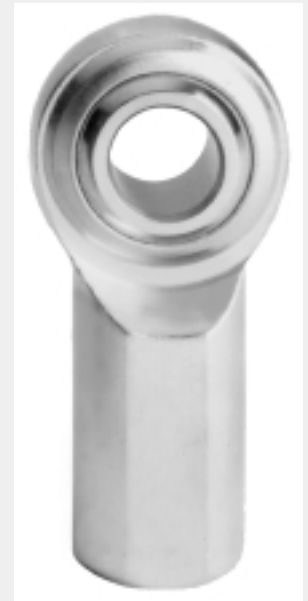
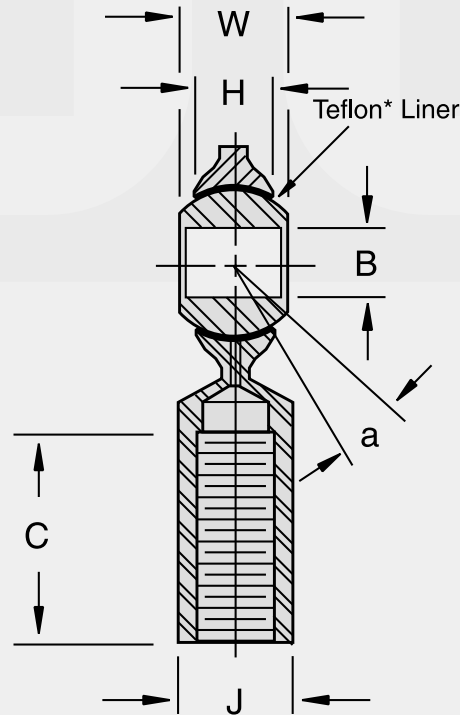
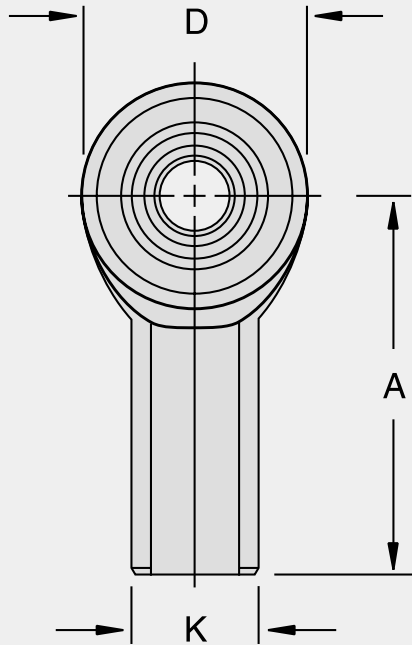
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: MSM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MSF-T

Precision, 2-Piece,
Teflon* Lined



Part Number		B +0.025 -0.005	W +0.000 -0.005	H REF	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +0.062 -0.031	UNF-3A	a*	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MSF3T	MSFL3T	.1900	.312	.234	1.062	.625	.406	.312	.437	.500	10-32	17	1,549	.04
MSF4T	MSFL4T	.2500	.375	.250	1.312	.750	.469	.375	.500	.687	1/4-28	21	2,587	.05
MSF5T	MSFL5T	.3125	.437	.312	1.375	.875	.500	.437	.625	.687	5/16-24	17	3,051	.08
MSF6T	MSFL6T	.3750	.500	.359	1.625	1.000	.687	.562	.719	.812	3/8-24	19	4,135	.13
MSF7T	MSFL7T	.4375	.562	.406	1.812	1.125	.750	.625	.812	.937	7/16-20	18	5,307	.18
MSF8T	MSFL8T	.5000	.625	.453	2.125	1.312	.875	.750	.875	1.062	1/2-20	17	7,725	.29
MSF10T	MSFL10T	.6250	.750	.484	2.500	1.500	1.000	.875	1.062	1.375	5/8-18	22	8,282	.43
MSF12T	MSFL12T	.7500	.875	.593	2.875	1.750	1.125	1.000	1.250	1.562	3/4-16	18	12,295	.65

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Permanently bonded to body I.D.

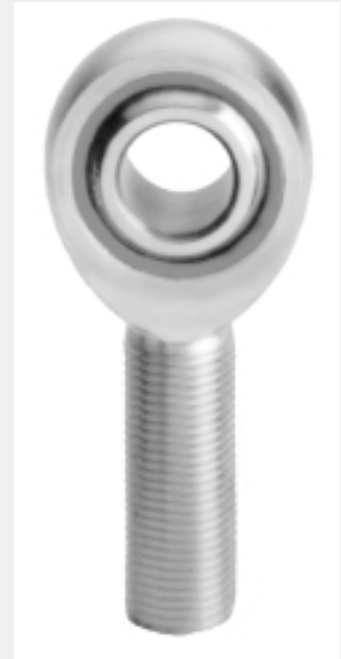
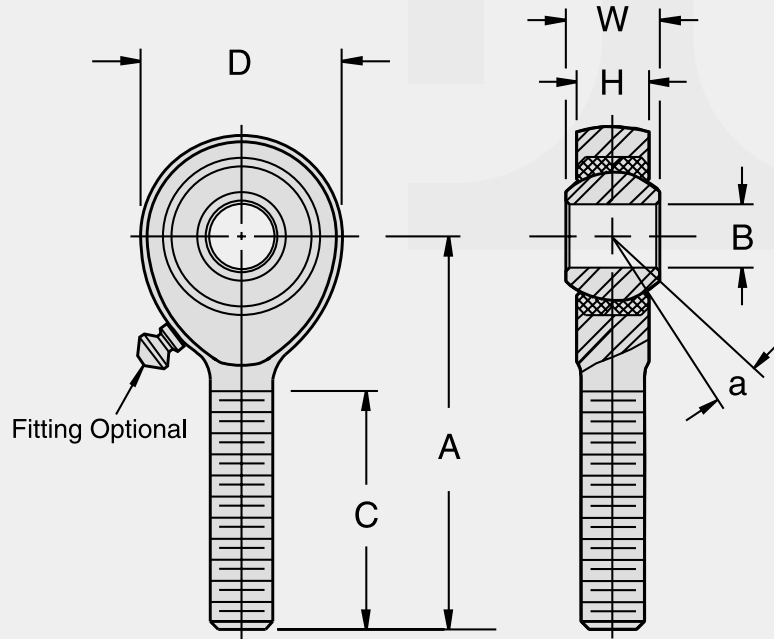
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: MSF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MBM

4-Piece, Bronze Race, Oil Impregnated



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MBM3	MBML3	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	1,169	.028
MBM4	MBML4	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	2,158	.043
MBM5	MBML5	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	2,784	.072
MBM6	MBML6	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	3,915	.112
MBM7	MBML7	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,218	.160
MBM8	MBML8	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	6,660	.249
MBM10	MBML10	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	7,364	.382
MBM12	MBML12	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	11,518	.602

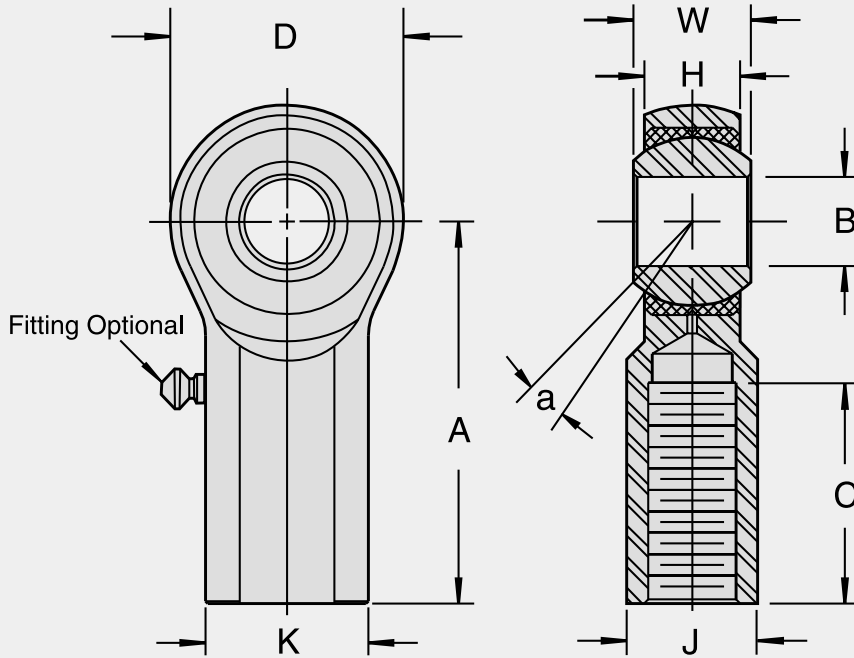
MATERIALS		
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix. Example: MBM7Z
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: MBM8S

MBF

4-Piece, Bronze Race, Oil Impregnated



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +0.062 -0.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MBF3	MBFL3	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	1,531	.038
MBF4	MBFL4	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	2,539	.059
MBF5	MBFL5	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	3,133	.092
MBF6	MBFL6	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	3,915	.152
MBF7	MBFL7	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	4,218	.198
MBF8	MBFL8	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	6,660	.329
MBF10	MBFL10	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	7,364	.477
MBF12	MBFL12	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	11,518	.723

MATERIALS

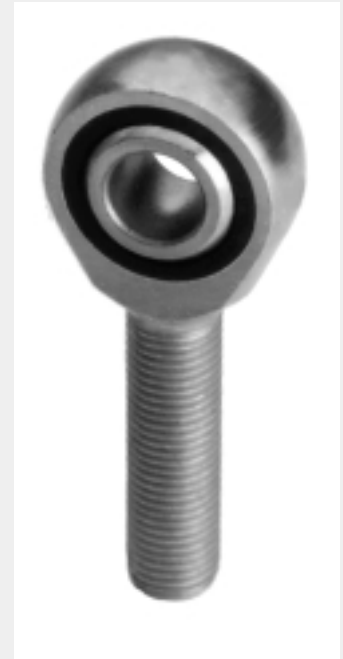
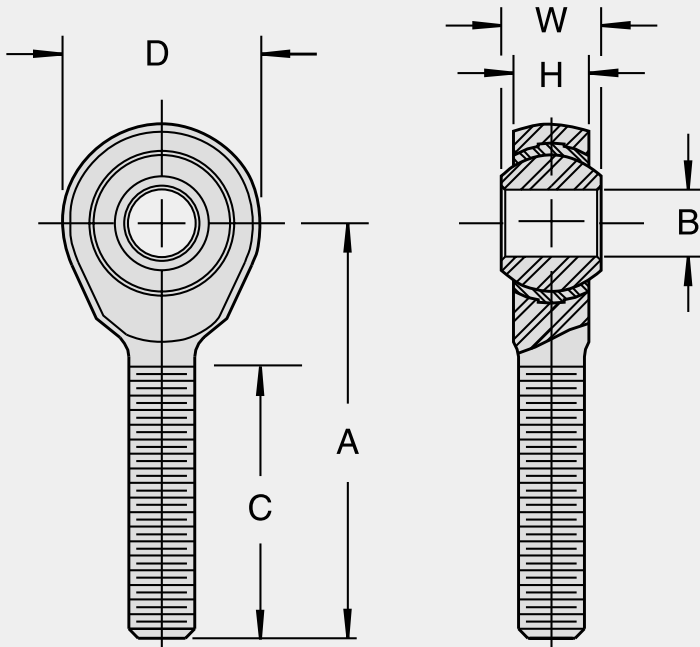
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

1. For standard zerklubrication fitting add "Z" to suffix. Example: MBF7Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: MBF8S

SPM

Molded Race, Self Lubricating



Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ±.015	REF	C ±.060	UNF-2A	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
SPM3	SPML3	.1900	.312	.250	1.250	.625	.438	.750	10-32	1210	.023
SPM4	SPML4	.2500	.375	.281	1.562	.750	.516	1.000	1/4-28	2470	.040
SPM5	SPML5	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	2740	.071
SPM6	SPML6	.3750	.500	.406	1.937	1.000	.719	1.250	3/8-24	4210	.107
SPM7	SPML7	.4375	.562	.437	2.125	1.125	.812	1.312	7/16-20	5350	.148
SPM8	SPML8	.5000	.625	.500	2.437	1.312	.938	1.500	1/2-20	6430	.232
SPM10	SPML10	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	8300	.364
SPM12	SPML12	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	10900	.568

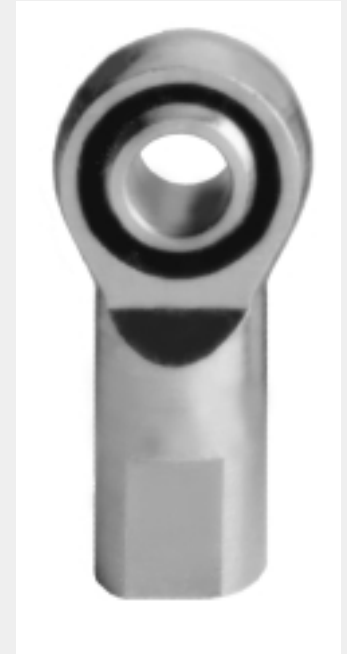
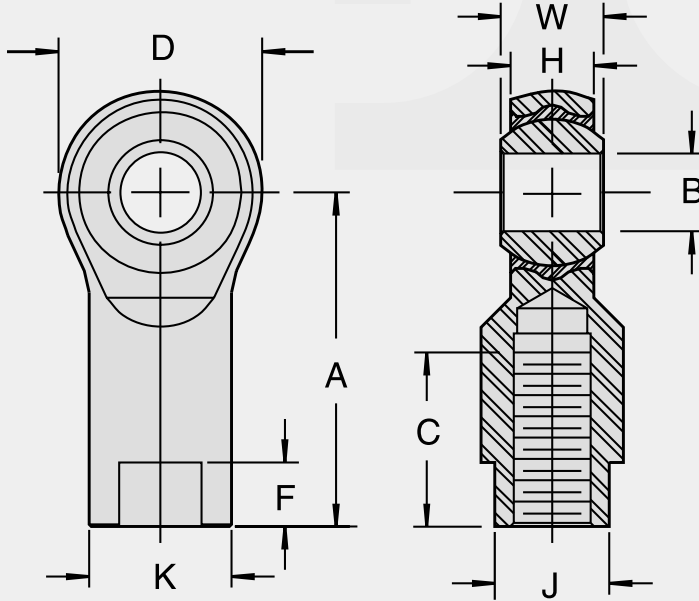
MATERIALS		
Ball	Body	Race
Low Carbon Steel Case Hardened Zinc Plated, Yellow Dichromate Treated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	Molded Self Lubricating Reinforced Nylon

NOTES:

1. This series features a molded race compound designed to provide low friction, low moisture absorbing properties and high wear resistance.
2. This series is also available in a studded configuration. (Refer to chart in this catalog, on page 66) Specify by adding "S" to suffix.
Example: SPM8S

SPF

Molded Race, Self Lubricating



Part Number		B +.0020 -.0000	W ±.005	H REF	A +.062 -.031	D ±.015	K ±.015	J ±.015	F ±.030	REF	C ±.060	UNF-2B	Ultimate Radial Static Load Capacity (Pounds)	Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Wrench Flat Length	Ball Diameter	Thread Length	Thread Size		
SPF3	SPFL3	.1900	.312	.250	1.062	.625	.406	.312	.406	.438	.562	10-32	1210	.036
SPF4	SPFL4	.2500	.375	.281	1.312	.750	.469	.375	.281	.516	.750	1/4-28	2470	.059
SPF5	SPFL5	.3125	.437	.344	1.375	.875	.500	.437	.281	.625	.750	5/16-24	2740	.077
SPF6	SPFL6	.3750	.500	.406	1.625	1.000	.687	.562	.312	.719	.937	3/8-24	4100	.146
SPF7	SPFL7	.4375	.562	.437	1.812	1.125	.750	.625	.625	.812	1.031	7/16-20	5350	.192
SPF8	SPFL8	.5000	.625	.500	2.125	1.312	.875	.750	.375	.938	1.187	1/2-20	6430	.313
SPF10	SPFL10	.6250	.750	.562	2.500	1.500	1.000	.875	.500	1.125	1.500	5/8-18	8300	.464
SPF12	SPFL12	.7500	.875	.687	2.875	1.750	1.125	1.000	1.000	1.312	1.562	3/4-16	10900	.672

MATERIALS

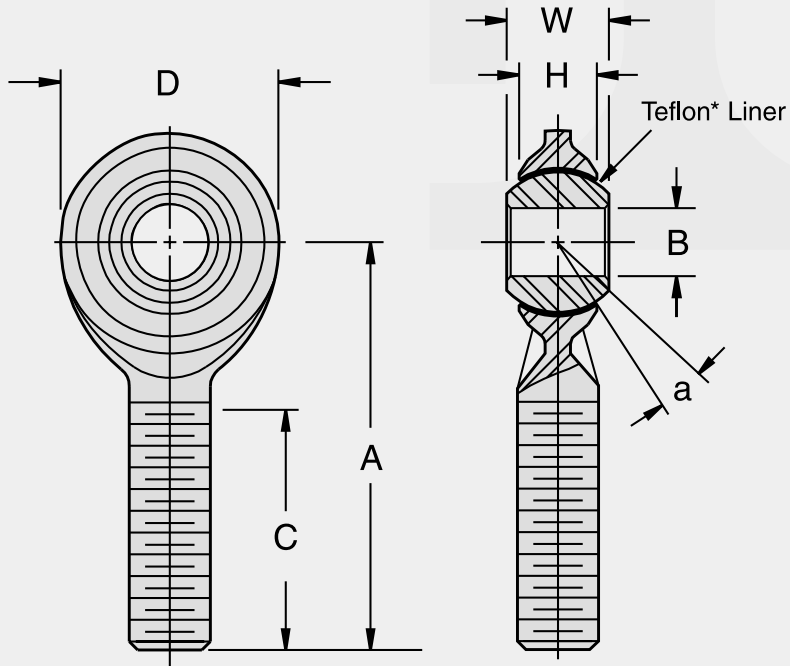
Ball	Body	Race
Low Carbon Steel	Low Carbon Steel	Molded
Case Hardened	Zinc Plated, Yellow	Self Lubricating
Zinc Plated, Yellow	Dichromate Treated	Reinforced Nylon
Dichromate Treated		

NOTES:

1. This series features a molded race compound designed to provide low friction, low moisture absorbing properties and high wear resistance.
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix.
Example: SPF8S

SSM-T

2-Piece, Stainless Steel, Teflon* Lined



Part Number		B +0.025 -0.005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSM3T	SSML3T	.1900	.312	.234	1.250	.625	.437	.750	10-32	17	900	.03
SSM4T	SSML4T	.2500	.375	.250	1.562	.750	.500	1.000	1/4-28	21	1,350	.04
SSM5T	SSML5T	.3125	.437	.312	1.875	.875	.625	1.250	5/16-24	17	2,000	.07
SSM6T	SSML6T	.3750	.500	.359	1.938	1.000	.719	1.250	3/8-24	19	3,000	.11
SSM7T	SSML7T	.4375	.562	.406	2.125	1.125	.812	1.375	7/16-20	18	3,750	.15
SSM8T	SSML8T	.5000	.625	.453	2.438	1.312	.875	1.500	1/2-20	17	4,650	.24
SSM10T	SSML10T	.6250	.750	.484	2.625	1.500	1.062	1.625	5/8-18	22	5,850	.36
SSM12T	SSML12T	.7500	.875	.593	2.875	1.750	1.250	1.750	3/4-16	18	7,500	.57

MATERIALS

Ball	Body	Liner
440C Stainless Steel Heat Treated	Type 303 Stainless Steel	Teflon* Permanently Bonded to Body I.D.

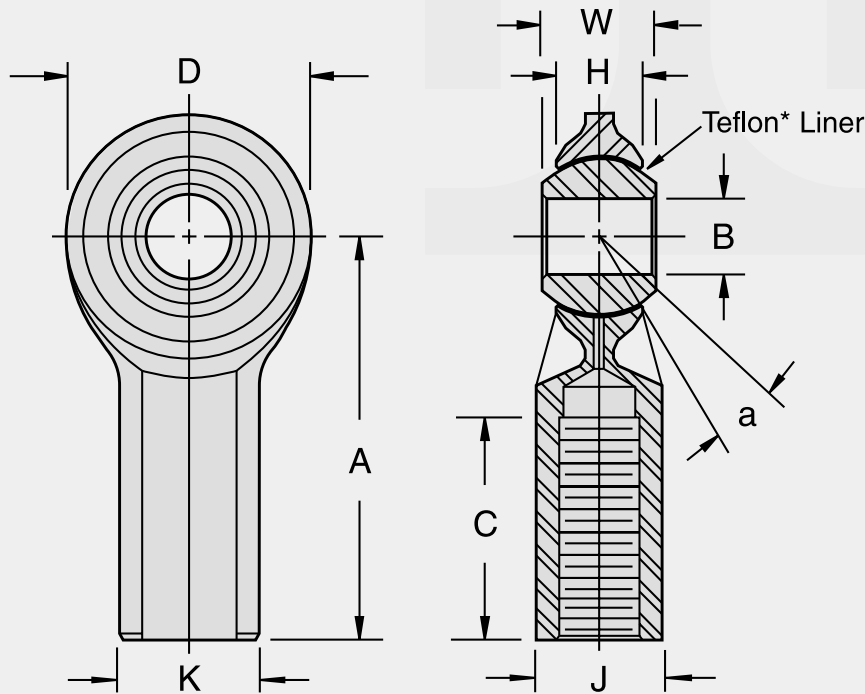
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix.
Example: SSM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSF-T

2-Piece, Stainless Steel, Teflon* Lined



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +0.062 -0.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSF3T	SSFL3T	.1900	.312	.234	1.062	.625	.406	.312	.437	.500	10-32	17	900	.04
SSF4T	SSFL4T	.2500	.375	.250	1.312	.750	.469	.375	.500	.687	1/4-28	21	1,350	.05
SSF5T	SSFL5T	.3125	.437	.312	1.375	.875	.500	.437	.625	.687	5/16-24	17	2,000	.08
SSF6T	SSFL6T	.3750	.500	.359	1.625	1.000	.687	.562	.719	.812	3/8-24	19	3,000	.13
SSF7T	SSFL7T	.4375	.562	.406	1.812	1.125	.750	.625	.812	.937	7/16-20	18	3,750	.18
SSF8T	SSFL8T	.5000	.625	.453	2.125	1.312	.875	.750	.875	1.062	1/2-20	17	4,650	.29
SSF10T	SSFL10T	.6250	.750	.484	2.500	1.500	1.000	.875	1.062	1.375	5/8-18	22	5,850	.43
SSF12T	SSFL12T	.7500	.875	.593	2.875	1.750	1.125	1.000	1.250	1.562	3/4-16	18	7,500	.65

MATERIALS

Ball	Body	Liner
440c Steel	Type 303	Teflon*
Stainless Steel	Stainless Steel	Permanently Bonded
Heat Treated		to Body I.D.

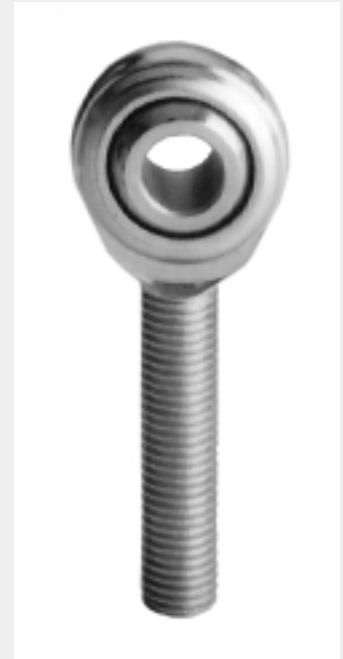
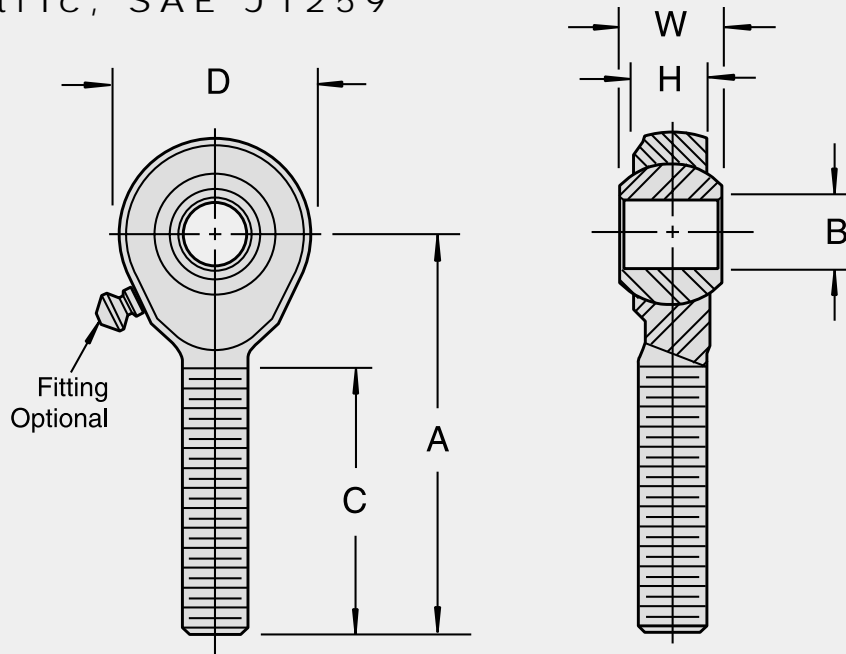
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix.
Example: SSF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

EM-M

Commercial, 2-Piece, Metal to Metal,
Metric, SAE J1259



Part Number	B $+0.07$ -0.00	W ± 0.15	H REF	A $+1.5$ -0.8	D ± 13	REF	C ± 1.5		Ultimate Radial Static Load Capacity (Newtons)	Weight (Grams)
Right Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size		
EM5M	5.0	8	6.0	32.0	15.7	11.1	19	M5x.8	7,384	12
EM6M	6.0	9	6.7	35.7	18.9	13.1	21	M6x1.0	10,097	19
EM8M	8.0	12	9.0	41.7	25.1	15.8	24	M8x1.25	20,950	41
EM10M	10.0	14	10.5	47.6	28.3	19.2	29	M10x1.5	27,489	65
EM12M	12.0	16	12.0	55.0	33.2	22.3	32	M12x1.75	32,604	104
EM14M	14.0	19	13.5	60.0	34.7	25.4	35	M14x2.0	37,586	136
EM16M	16.0	21	15.0	66.7	37.9	28.5	40	M16x2.0	42,478	213

MATERIALS

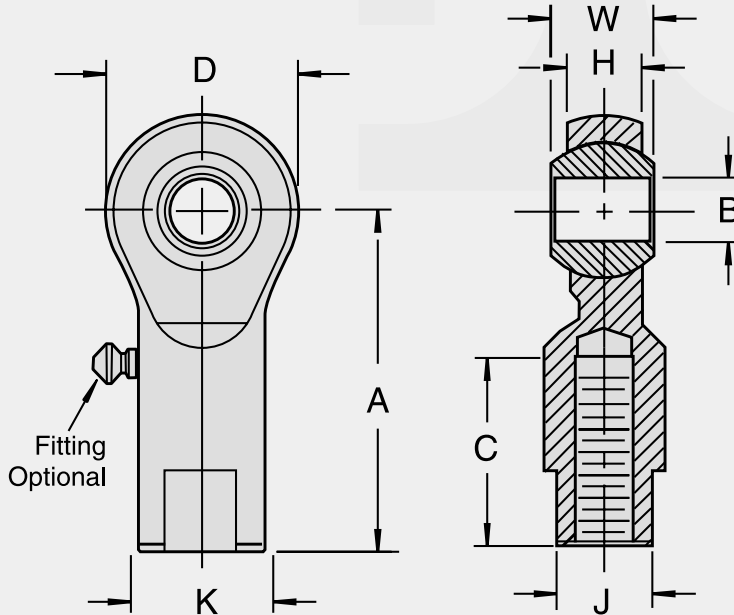
Ball	Body	Liner (optional)
Low Carbon Steel	Low Carbon Steel	PTFE
Case Hardened	Zinc Plated, Yellow	Bonded to Body I.D.
Zinc Plated, Yellow	Dichromate Treated	
Dichromate Treated		

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: EM8MS
2. Teflon fabric liner optional. Specify by adding "T" to suffix. Example: EM8MT

EF-M

Commercial, 2-Piece, Metal to Metal,
Metric, SAE J1259



Part Number	B $+0.07$ -0.00	W ± 0.15	H REF	A $+1.5$ -0.8	D $\pm .13$	K ± 0.38	J ± 0.38	REF	C ± 1.5	Ultimate Radial Static Load Capacity (Newtons)	Weight (Grams)	
Right Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat Width	Ball Diameter	Thread Length	Thread Size		
EF5M	5.0/5.07	8	6.0	26.0	15.7	11	8.9	11.1	9.0	M5x.8	10,542	20
EF6M	6.0/6.07	9	6.7	29.7	18.9	13	9.9	13.1	12.0	M6x1.0	14,412	31
EF8M	8.0/8.07	12	9.0	35.7	25.1	16	12.4	15.8	16.0	M8x1.25	29,935	61
EF10M	10.0/10.07	14	10.5	42.8	28.3	19	14.9	19.2	19.5	M10x1.5	34,383	98
EF12M	12.0/12.07	16	12.0	49.0	33.2	22	17.4	22.3	21.0	M12x1.75	40,788	145
EF14M	14.0/14.07	19	13.5	57.0	34.7	25	20.0	25.4	25.4	M14x2.0	41,766	211
EF16M	16.0/16.07	21	15.0	64.0	37.9	27	22.0	28.5	27.0	M16x2.0	47,238	214

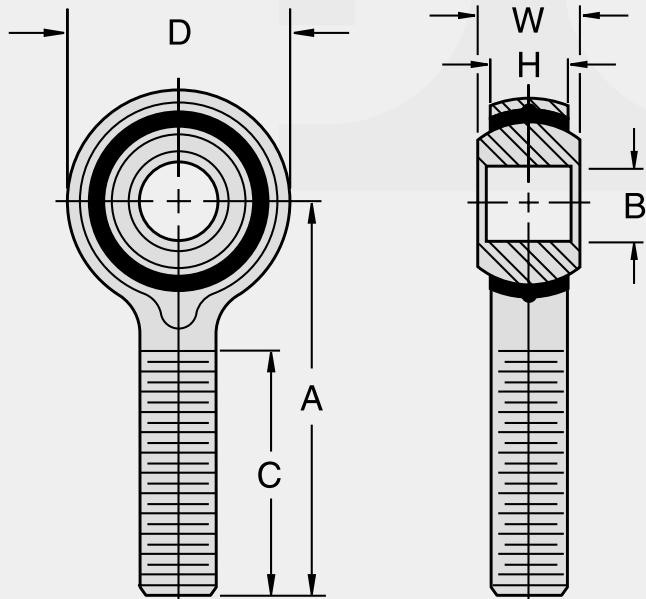
MATERIALS		
Ball	Body	Liner (optional)
Low Carbon Steel	Low Carbon Steel	PTFE
Case Hardened	Zinc Plated, Yellow	Bonded to Body I.D.
Zinc Plated, Yellow	Dichromate Treated	
Dichromate Treated		

NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: EF8MS
2. Teflon liner optional. Specify by adding "T" to suffix. Example: EF8MT

MJ-M

Metric Molded Race Male Rod Ends



Part Number		B <small>+0.063 -0.13</small>	W <small>± 0.13</small>	H <small>± 0.05</small>	A <small>± 0.25</small>	C <small>+0 -1</small>	D <small>± 0.13</small>		Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	Thread Size			
MJ3M	MLJ3M	3	6	4.50	27	15	12	M3x0.5	3,038	9.0	10
MJ5M	MLJ5M	5	8	6.00	33	20	16	M5x0.8	5,338	11.1	15
MJ6M	MLJ6M	6	9	6.75	36	22	18	M6x1.0	7,722	13.1	20
MJ8M	MLJ8M	8	12	9.00	42	25	22	M8x1.25	12,775	15.8	35
MJ10M	MLJ10M	10	14	10.50	48	29	26	M10x1.5	16,960	19.2	50
MJ12M	MLJ12M	12	16	12.00	54	33	30	M12x1.75	22,898	22.3	65
MJ14M	MLJ14M	14	19	13.50	60	36	34	M14x2.0	28,948	25.4	100
MJ16M	MLJ16M	16	21	15.00	66	40	38	M16x2.0	37,127	28.5	179
MJ18MC	MLJ18MC	18	23	16.50	72	43	46	M18x1.5	45,730	31.7	209
MJ20MC	MLJ20MC	20	25	18.00	78	46	50	M20x1.5	55,235	34.9	289
MJ22MC	MLJ22MC	22	28	20.00	84	50	56	M22x1.5	66,289	38.1	323

MATERIALS

Ball

Low Carbon Steel
Case Hardened
Nickel Plated

Body

Low Carbon Steel
Zinc Plated, Yellow
Dichromate Treated

Race

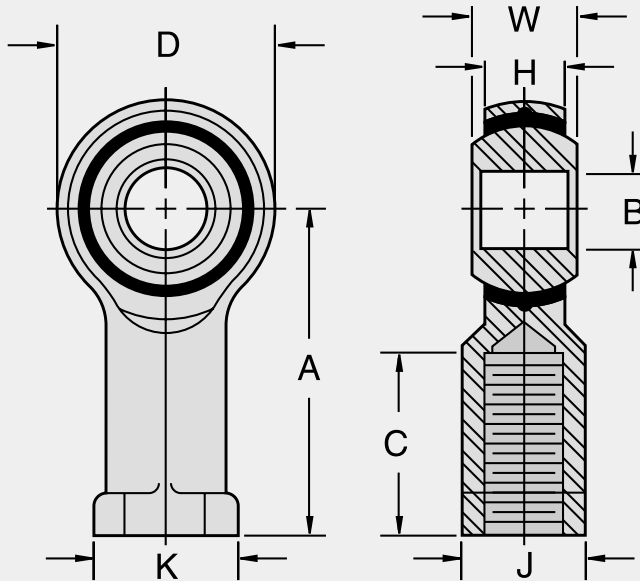
Molded Plastic
Self Lubricating

NOTES:

- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: MJ8MS

FJ-M

Metric Molded Race Female Rod Ends



Part Number		B <small>+0.063 -0.013</small>	W <small>± 0.13</small>	H <small>± 0.05</small>	A <small>± 0.25</small>	C <small>+0 -1</small>	D <small>± 0.13</small>	K <small>± 0.2</small>	J <small>+0 -0.2</small>		Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	W.F. Diameter	W.F. Width	Thread Size			
FJ3M	FLJ3M	3	6	4.50	21	10	12	8	6.50	M3x0.5	3,038	9.0	14
FJ5M	FLJ5M	5	8	6.00	27	14	16	11	9.00	M5x0.8	5,338	11.1	20
FJ6M	FLJ6M	6	9	6.75	30	14	18	13	11.00	M6x1.0	7,722	13.1	30
FJ8M	FLJ8M	8	12	9.00	36	17	22	16	14.00	M8x1.25	12,775	15.8	39
FJ10M	FLJ10M	10	14	10.50	43	21	26	19	17.00	M10x1.5	16,960	19.2	75
FJ10MC	FLJ10MC	10	14	10.50	43	21	26	19	17.00	M10x1.25	16,960	19.2	75
FJ12M	FLJ12M	12	16	12.00	50	24	30	22	19.00	M12x1.75	22,898	22.3	124
FJ12MC	FLJ12MC	12	16	12.00	50	24	30	22	19.00	M12x1.5	22,898	22.3	124
FJ14M	FLJ14M	14	19	13.50	57	37	34	25	22.00	M14x2.0	28,948	25.4	174
FJ16M	FLJ16M	16	21	15.00	64	33	38	27	22.00	M16x2.0	37,127	28.5	229
FJ16MC	FLJ16MC	16	21	15.00	64	33	38	27	22.00	M16x1.5	37,127	28.5	229
FJ18MC	FLJ18MC	18	23	16.50	71	35	46	31	27.00	M18x1.5	45,730	31.7	309
FJ20M	FLJ20M	20	25	18.00	77	32	50	34	32.00	M20x1.5	55,235	34.9	358
FJ22M	FLJ22M	22	28	20.00	84	36	56	37	32.00	M22x1.5	66,289	38.1	423

MATERIALS

Ball	Body	Race
Low Carbon Steel Case Hardened Nickel Plated	Low Carbon Steel Zinc Plated, Yellow Dichromate Treated	Molded Plastic Self Lubricating

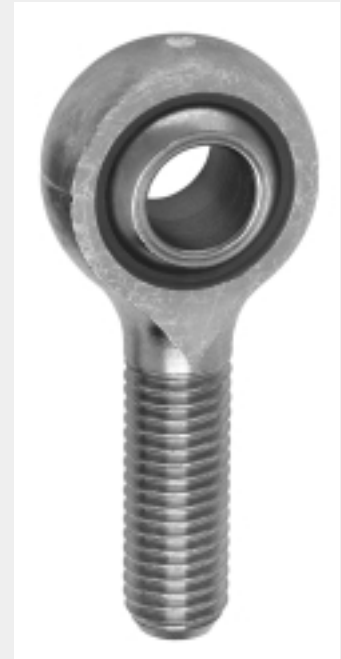
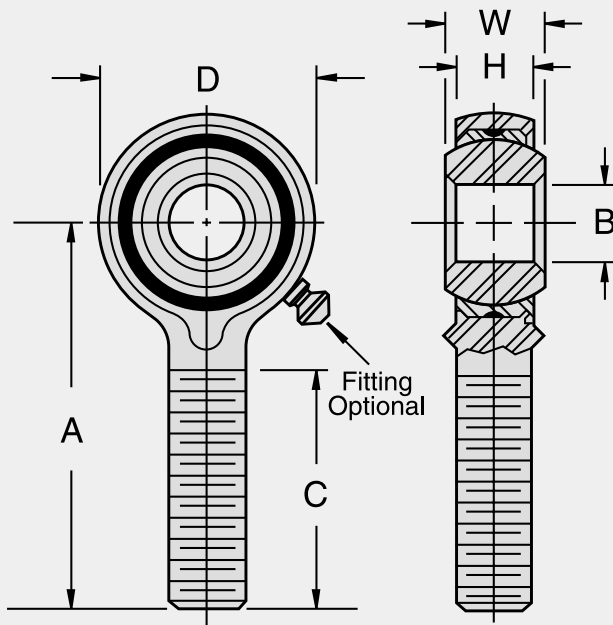
NOTES:

- This series is also available in a studed configuration. (Refer to chart in this catalog on page 66). Specify by adding "S" to suffix. Example: FJ8MS



DBM

Metric Bronze Race Male Rod Ends
to DIN 648



Part Number		B $+0.063$ -0.013	W ± 0.13	H ± 0.05	A ± 0.25	C $+0$ -1	D ± 0.13		Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	Thread Size			
DBM5	DBML5	5	8	6.00	33	20	18	M5x0.8	3,000	13	15
DBM6	DBML6	6	9	6.75	36	22	20	M6x1.0	4,000	16	20
DBM8	DBML8	8	12	9.00	42	25	24	M8x1.25	8,000	19	35
DBM10	DBML10	10	14	10.50	48	29	28	M10x1.25	13,000	22	50
DBM12	DBML12	12	16	12.00	54	33	32	M12x1.25	17,000	26	65
DBM14	DBML14	14	19	13.50	60	36	36	M14x1.5	24,000	29	100
DBM16	DBML16	16	21	15.00	66	40	42	M16x1.5	28,500	32	179
DBM20	DBML20	20	25	18.00	78	47	50	M20x1.5	42,000	40	289

MATERIALS

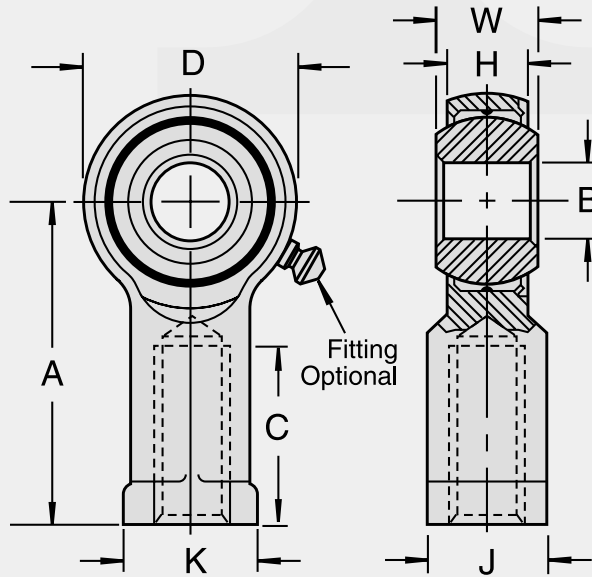
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix. Example: DBM7Z
- This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: DBM8S

DBF

Metric Bronze Race Female Rod Ends
to DIN 648



Part Number		B $+0.063$ -0.13	W ± 0.13	H ± 0.05	A ± 0.25	C $+0$ -1	D ± 0.13		K ± 0.2	J $+0$ -0.2	Ultimate Radial Static Load Capacity (Newtons)	Ball Diameter Ref.	Weight Approx. (Grams)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	Centerline Length	Thread Length	Head Diameter	Thread Size	W.F. Diameter	W.F. Width			
DBF5	DBFL5	5	8	6.00	27	10	18	M5x0.8	11	9	6,000	13	15
DBF6	DBFL6	6	9	6.75	30	12	20	M6x1.0	13	11	7,000	16	19
DBF8	DBFL8	8	12	9.00	36	16	24	M8x1.25	16	14	12,000	19	30
DBF10	DBFL10	10	14	10.50	43	20	28	M10x1.25	19	17	14,500	22	40
DBF12	DBFL12	12	16	12.00	50	22	32	M12x1.25	22	19	17,000	26	75
DBF14	DBFL14	14	19	13.50	57	22	36	M14x1.5	25	22	24,000	29	124
DBF16	DBFL16	16	21	15.00	64	28	42	M16x1.5	27	22	28,500	32	174
DBF20	DBFL20	20	25	18.00	77	33	50	M20x1.5	34	32	45,000	40	358

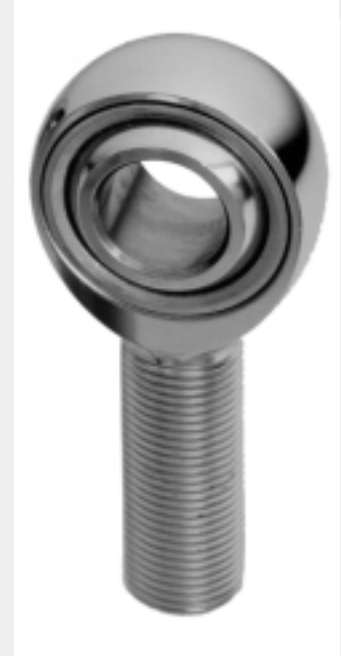
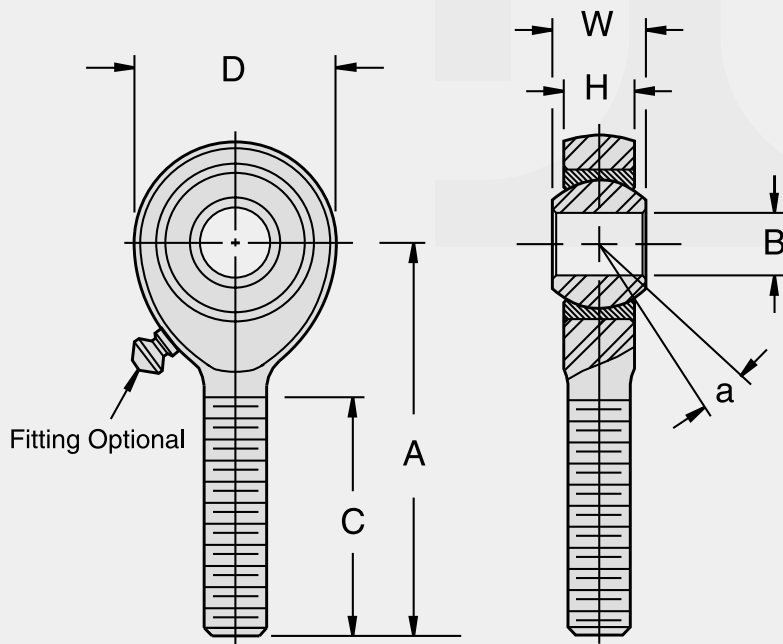
MATERIALS		
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Sintered Phosphor Bronze Oil Impregnated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix. Example: DBF7Z
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: DBF8S

MTSM

3-Piece, Metal to Metal



Part Number		B +0.025 -0.005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSM3	MTSML3	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	1,169	.028
MTSM4	MTSML4	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	2,158	.043
MTSM5	MTSML5	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	2,784	.072
MTSM6	MTSML6	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	3,915	.112
MTSM7	MTSML7	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,218	.160
MTSM8	MTSML8	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	6,660	.249
MTSM10	MTSML10	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	7,364	.382
MTSM12	MTSML12	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	11,518	.602
MTSM16	MTSML16	1.0000	1.375	1.000	4.125	2.750	1.875	2.125	1 1/4-12	14	43,541	2.127

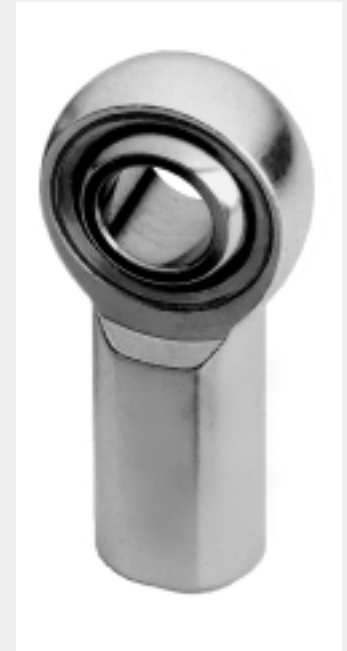
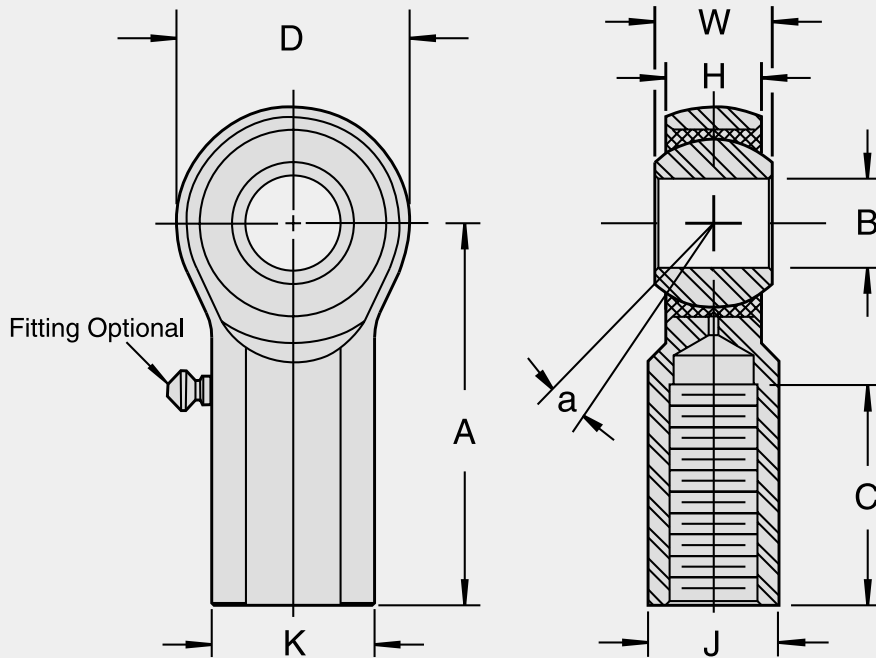
MATERIALS		
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Mild Steel Zinc Plated Clear Chromate Treated	Mild Steel Zinc Plated Clear Chromate Treated

- NOTES:
- For standard zerklubrication fitting add "Z" to suffix. Example: MTSM8Z
 - This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: MTSM8S
 - Optional heat treated alloy steel race is available at additional cost. Please contact our sales department.

*MTSM16 and MTSML16 rod ends are supplied with low carbon steel black oxide coated races and are not available in a studded configuration.

MTSF

3-Piece, Metal to Metal



Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSF3	MTSFL3	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	1,531	.038
MTSF4	MTSFL4	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	2,539	.059
MTSF5	MTSFL5	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	3,133	.092
MTSF6	MTSFL6	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	3,915	.152
MTSF7	MTSFL7	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	4,218	.198
MTSF8	MTSFL8	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	6,660	.329
MTSF10	MTSFL10	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	7,364	.477
MTSF12	MTSFL12	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	11,518	.723
MTSF16	MTSFL16	1.0000	1.375	1.000	4.125	2.750	1.625	1.500	1.875	2.125	1 1/4-12	14	43,541	2.125

MATERIALS		
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated

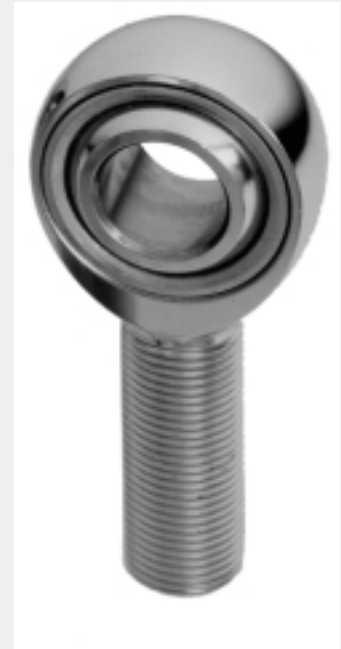
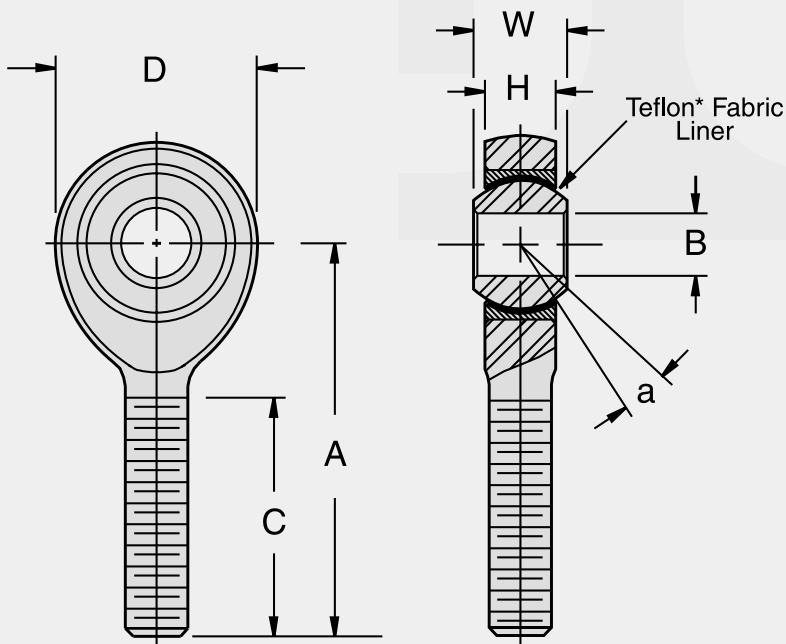
NOTES:

1. For standard zerk lubrication fitting add "Z" to suffix. Example: MTSF8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog page 66) Specify by adding "S" to suffix. Example: MTSF8S
3. Optional heat treated alloy steel race is available at additional cost. Please contact our sales department.

*MTSF16 and MTSFL16 rod ends are supplied with low carbon steel black oxide coated races and are not available in a studded configuration.

MTSM-T

3-Piece, Teflon* Lined



Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSM3T	MTSML3T	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	1,169	.028
MTSM4T	MTSML4T	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	2,158	.043
MTSM5T	MTSML5T	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	2,784	.072
MTSM6T	MTSML6T	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	3,915	.112
MTSM7T	MTSML7T	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,218	.160
MTSM8T	MTSML8T	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	6,660	.249
MTSM10T	MTSML10T	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	7,364	.382
MTSM12T	MTSML12T	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	11,518	.602

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

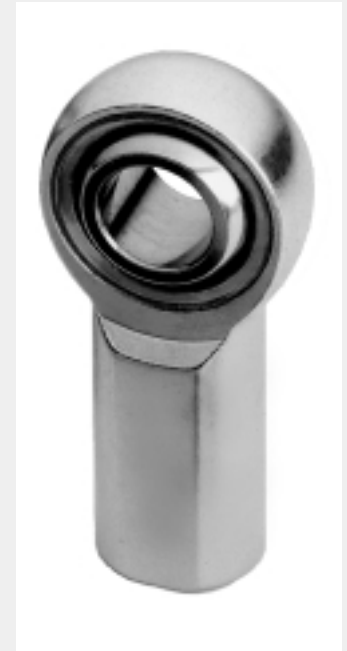
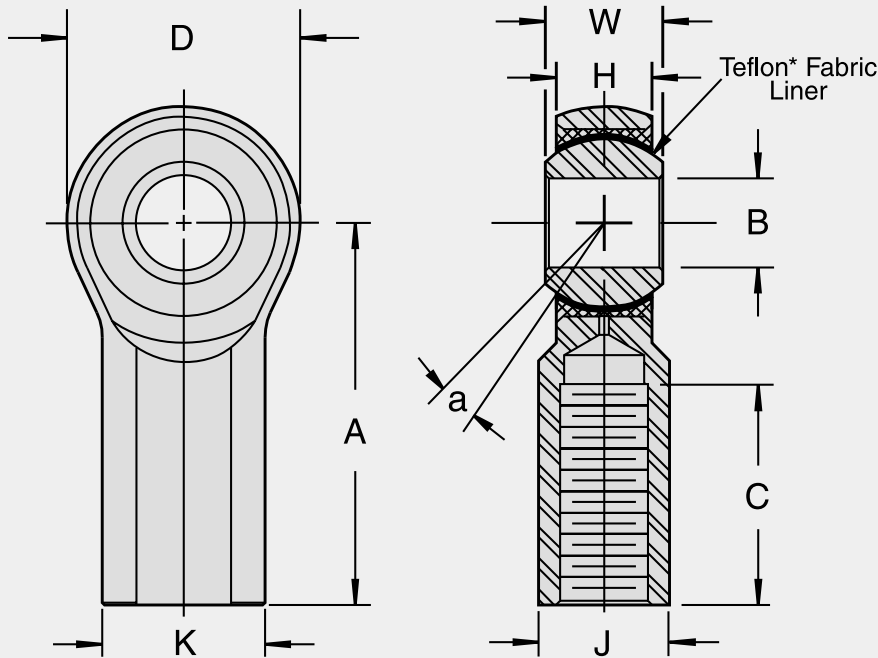
NOTES:

- This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: MTSM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MTSF-T

3-Piece, Teflon* Lined



Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	K ±.010	J ±.010	REF	C +.062 -.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MTSF3T	MTSFL3T	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	1,531	.038
MTSF4T	MTSFL4T	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	2,539	.059
MTSF5T	MTSFL5T	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	3,133	.092
MTSF6T	MTSFL6T	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	3,915	.152
MTSF7T	MTSFL7T	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	4,218	.198
MTSF8T	MTSFL8T	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	6,660	.329
MTSF10T	MTSFL10T	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	7,364	.477
MTSF12T	MTSFL12T	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	11,518	.723

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

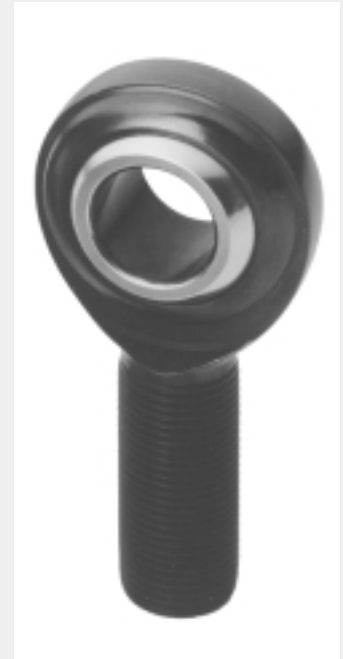
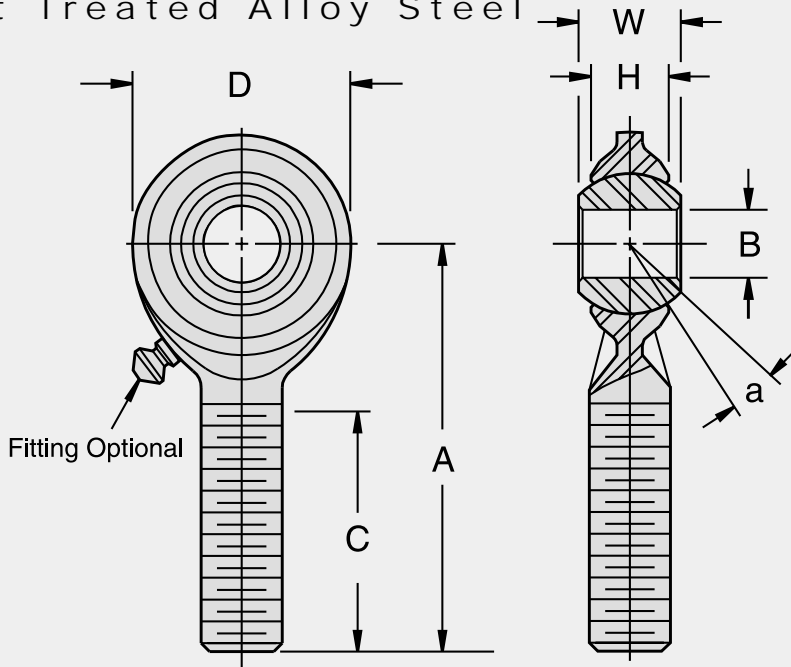
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: MTSF8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

MAX

2-Piece, Metal to Metal,
Heat Treated Alloy Steel



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MAX8	MAXL8	.5000	.625	.453	2.438	1.312	.937	1.500	1/2-20	17	16,646	.36
MAX10	MAXL10	.6250	.750	.484	2.625	1.500	1.125	1.625	5/8-18	22	17,415	.57
MAX12	MAXL12	.7500	.875	.593	2.875	1.750	1.312	1.750	3/4-16	18	24,038	.57

MATERIALS

Ball

52100 Steel
Rc 56 Min.
Hard Chrome Plated

Body

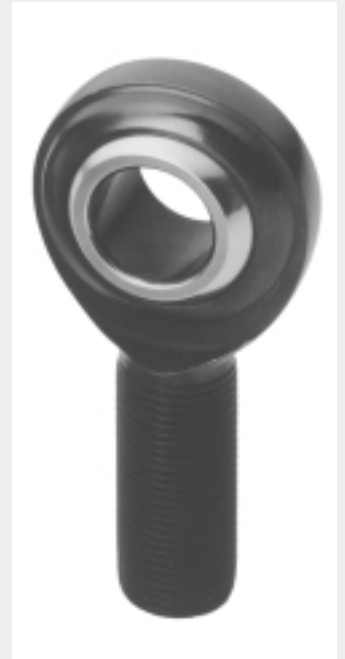
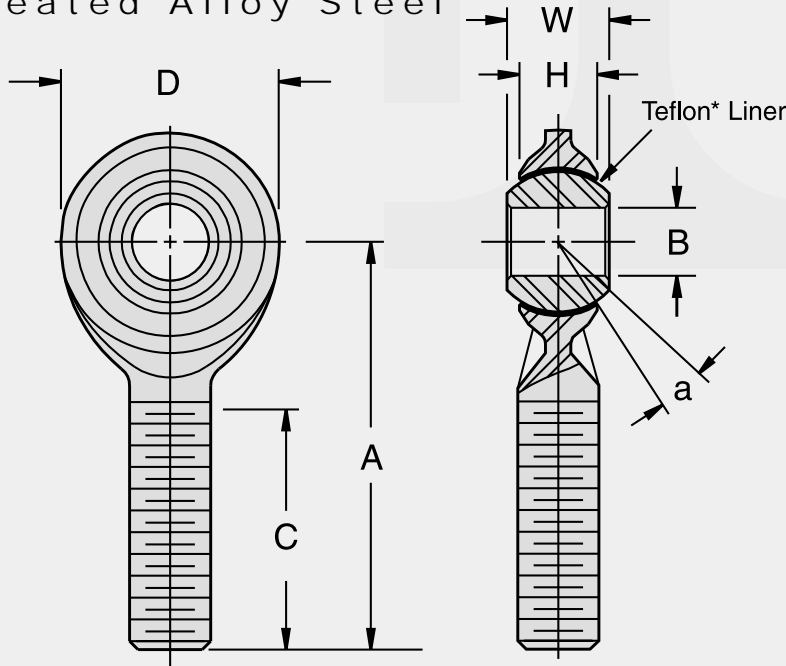
Alloy Steel
Heat Treated
Black Oxide Coated

NOTES:

1. For standard zerk lubrication fitting add "Z" to suffix.
Example: MAX8Z
2. This series is also available in a studed configuration.
(Refer to chart in this catalog on page 66).
Specify by adding "S" to suffix. Example: MAX8S

MAX-T

2-Piece, Teflon* Lined,
Heat Treated Alloy Steel



Part Number		B +.0025 -.0005	W +.000 -.005	H ±.015	A ±.015	D ±.010	REF	C +.062 -.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
MAX8T	MAXL8T	.5000	.625	.453	2.438	1.312	.937	1.500	1/2-20	17	16,646	.36
MAX10T	MAXL10T	.6250	.750	.484	2.625	1.500	1.125	1.625	5/8-18	22	17,415	.57
MAX12T	MAXL12T	.7500	.875	.593	2.875	1.750	1.312	1.750	3/4-16	17	24,038	.57

MATERIALS

Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Black Oxide Coated	Teflon* Permanently Bonded to Body I.D.

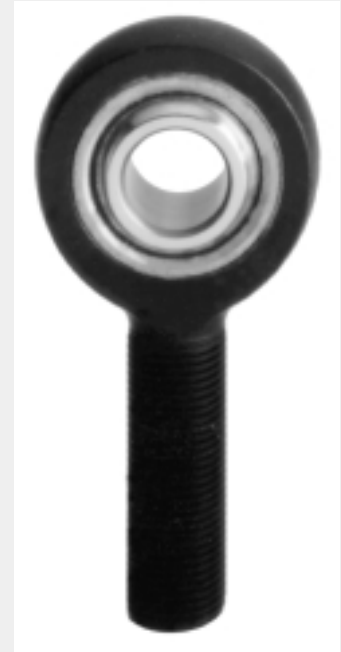
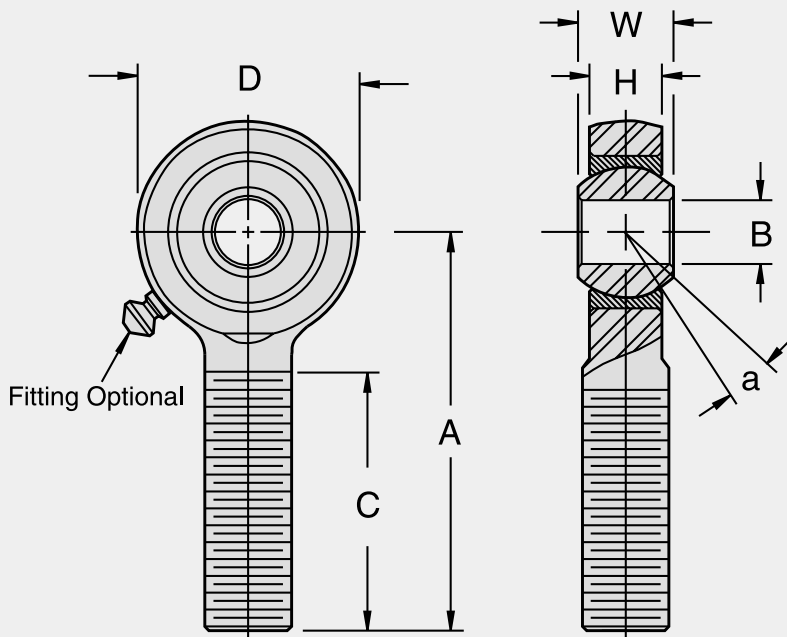
NOTES:

1. This series is also available in a studded configuration.
(Refer to chart in this catalog on page 66).
Specify by adding "S" to suffix. Example: MAX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

KCA

3-Piece, Aluminum, Metal to Metal



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCA6	KCAL6	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	4,110	.057
KCA7	KCAL7	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,429	.094
KCA8	KCAL8	.5000	.625	.500	2.625	1.500	.937	1.500	1/2-20	12	10,155	.130
KCA10	KCAL10	.6250	.750	.562	2.875	1.750	1.125	1.625	5/8-18	16	16,211	.187
KCA12	KCAL12	.7500	.875	.687	3.000	2.000	1.312	1.750	3/4-16	14	23,392	.300

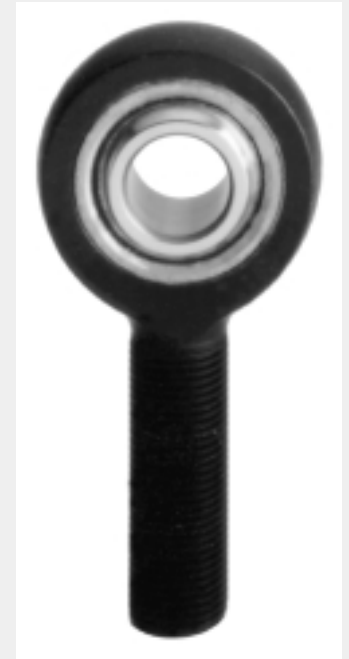
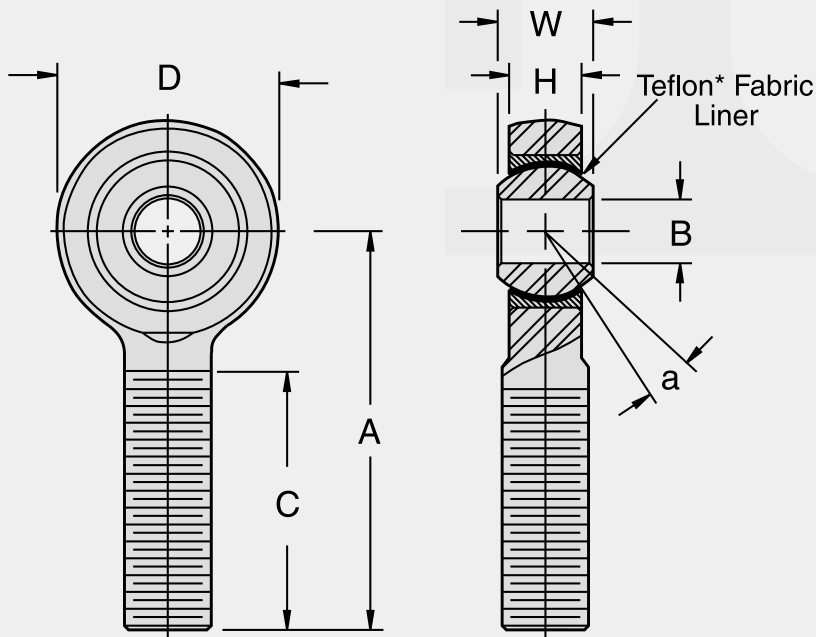
MATERIALS		
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Aluminum Black Anodized	Low Carbon Steel Zinc Plated Clear Chromate Treated

NOTES:

1. For standard zerk lubrication fitting add "Z" to suffix. Example: KCA8Z
2. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: KCA8S
3. Optional heat treated alloy steel race is available at additional cost. Please contact our sales department.

KCA-T

3-Piece, Aluminum, Teflon* Lined



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±0.005	A ±0.015	D ±0.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCA6T	KCAL6T	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	4,110	.057
KCA7T	KCAL7T	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	4,429	.094
KCA8T	KCAL8T	.5000	.625	.500	2.625	1.500	.937	1.500	1/2-20	12	10,155	.130
KCA10T	KCAL10T	.6250	.750	.562	2.875	1.750	1.125	1.625	5/8-18	16	16,211	.187
KCA12T	KCAL12T	.7500	.875	.687	3.000	2.000	1.312	1.750	3/4-16	14	23,392	.300

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Aluminum Black Anodized	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

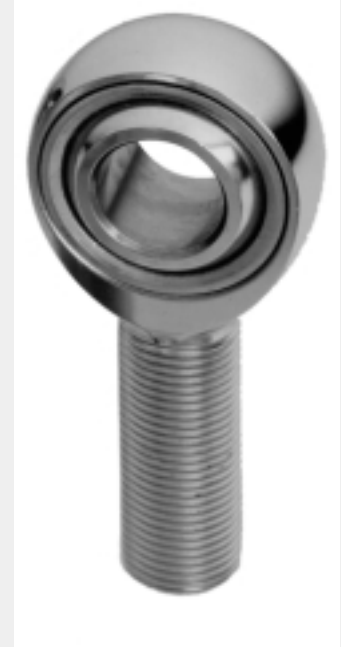
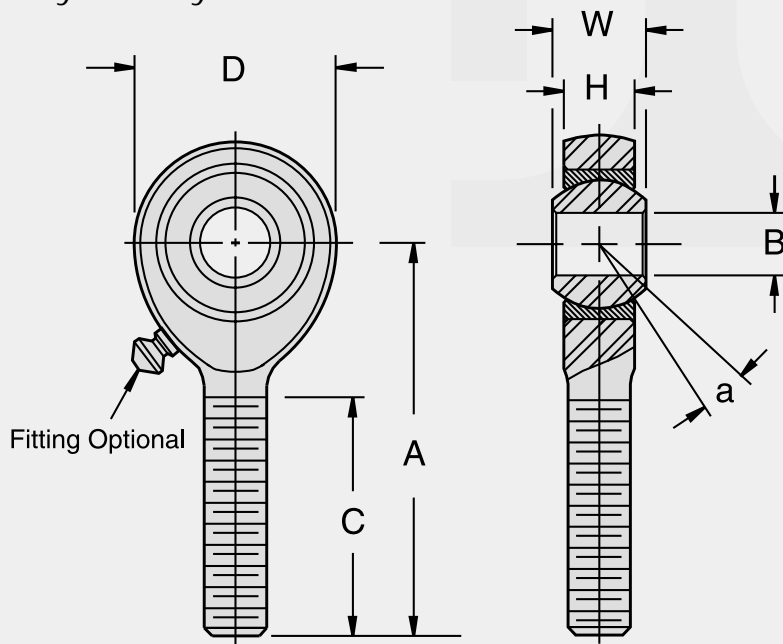
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: KCA8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

TSMX

3-Piece, Metal to Metal,
Heavy Duty



Part Number		B +0.025 -0.005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSMX3	TSMXL3	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	2,851	.028
TSMX4	TSMXL4	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	5,260	.043
TSMX5	TSMXL5	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	7,639	.072
TSMX6	TSMXL6	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	9,544	.112
TSMX7	TSMXL7	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	10,285	.160
TSMX8	TSMXL8	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	16,238	.249
TSMX10	TSMXL10	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	17,955	.382
TSMX12	TSMXL12	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	28,081	.602

MATERIALS

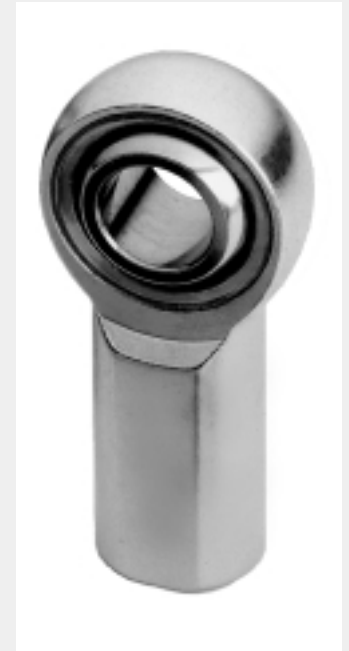
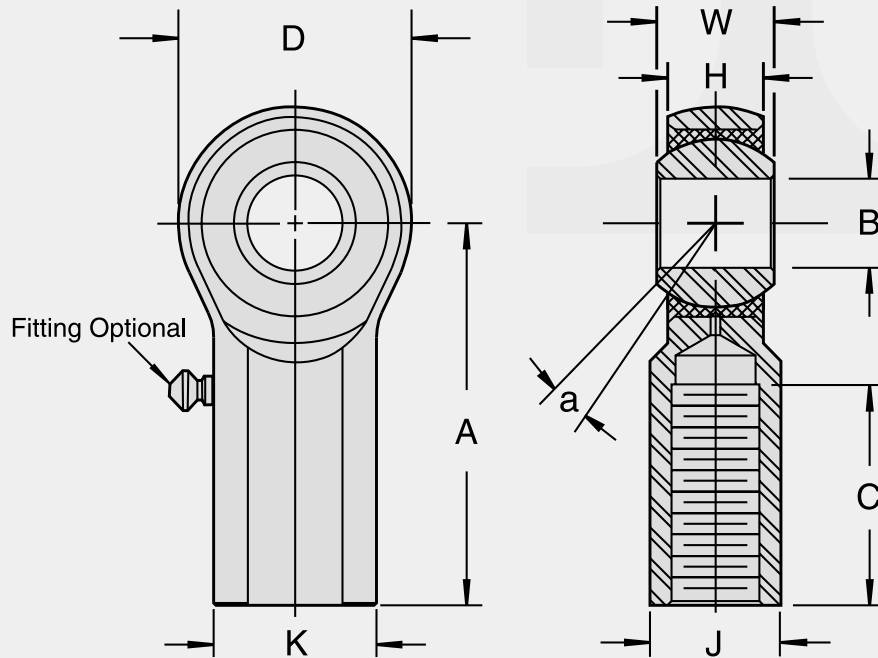
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix. Example: TSMX8Z
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: TSMX8S

TSMX

3-Piece, Metal to Metal,
Heavy Duty



Part Number		B +0.025 -0.005	W +0.00 -0.005	H ±0.15	A ±0.15	D ±0.10	K ±0.10	J ±0.10	REF	C +0.062 -0.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSMX3	TSMXL3	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	3,733	.038
TSMX4	TSMXL4	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	6,190	.059
TSMX5	TSMXL5	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	7,639	.092
TSMX6	TSMXL6	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	9,544	.152
TSMX7	TSMXL7	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	10,285	.198
TSMX8	TSMXL8	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	15,336	.329
TSMX10	TSMXL10	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	17,955	.477
TSMX12	TSMXL12	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	28,081	.723

MATERIALS		
Ball	Body	Race
52100 Steel	Heat Treated	Heat Treated
Rc 56 Min.	Alloy Steel	Alloy Steel
Hard Chrome Plated	Zinc Plated	Zinc Plated
	Clear Chromate	Clear Chromate
	Treated	Treated

NOTES:

- For standard zerkl lubrication fitting add "Z" to suffix. Example: TSMX8Z
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: TSMX8S

Custom Designed Products

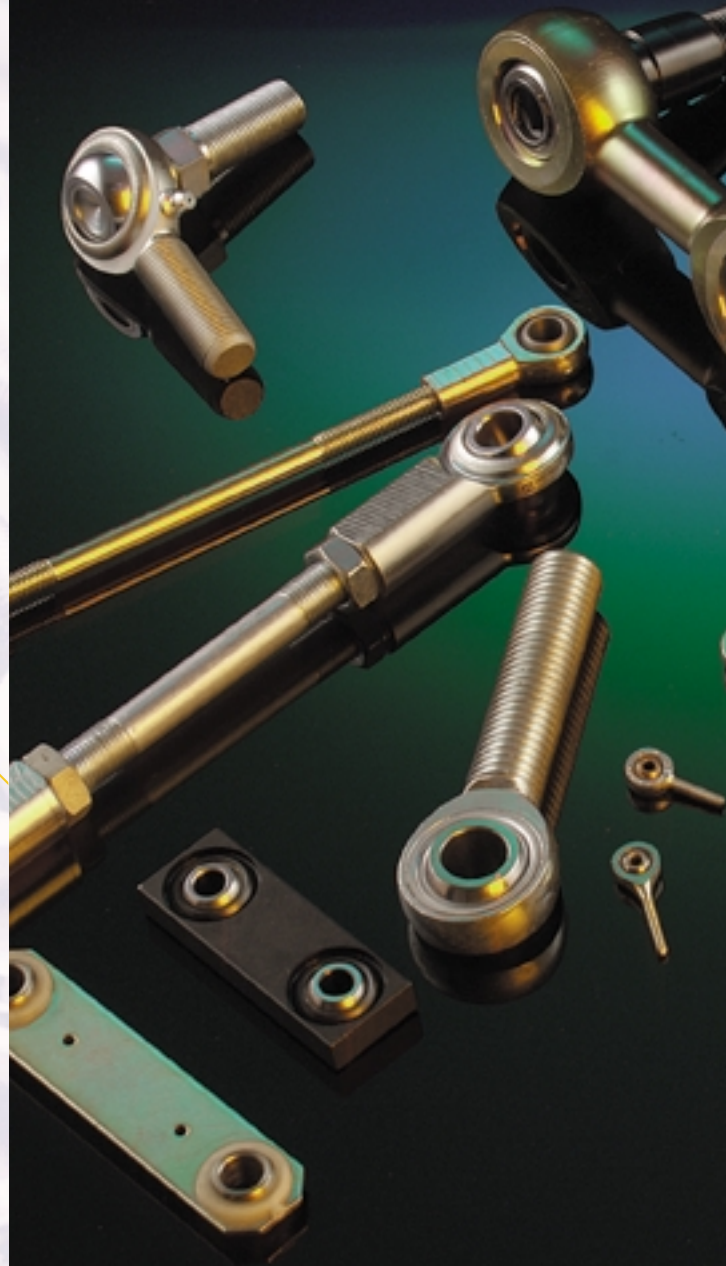
Tuthill Linkage Group (TLG) is more than a source for standard linkage products. TLG also designs and produces a wide range of specialized rod ends, ball joints and linkage assemblies. Each of these products is carefully engineered to meet the exact requirements of a particular application and manufactured to high quality standards to provide a cost-effective solution.

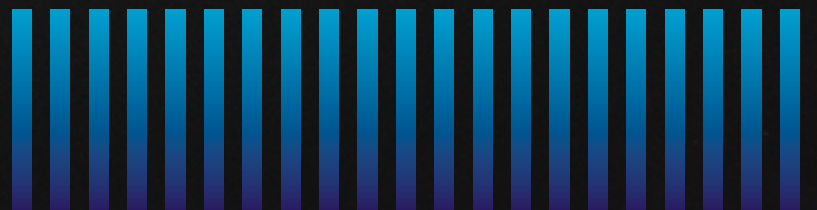


TLG rod ends and ball joints are combined with solid rods, solid-threaded rods, tubing, trunnions, clevises, hexagon fittings and nearly any other linkage component to create complete assemblies that are ready for installation. High quality steering, shift and throttle linkages, control rod assemblies, draft and valve controls, activating linkages, cable shift controls and more can be economically created using TLG products.

As shown in the illustration, a wide variety of design modifications have been used to make TLG products meet unusual design requirements.

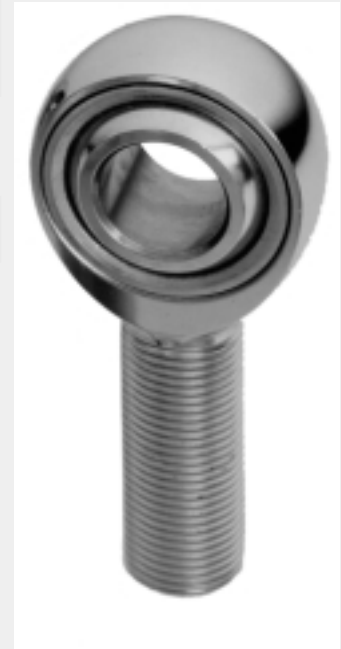
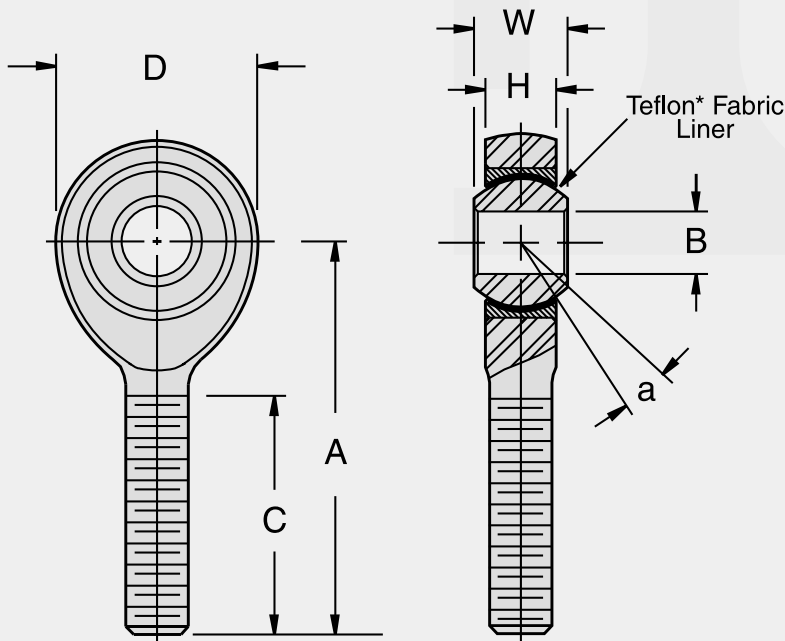
In addition to special products, TLG also provides special application assistance. With extensive experience in linkage design, TLG engineers will help you and your design group make the correct choice of linkage products to get the best possible results at the lowest possible cost. And the earlier they're involved in your project, the more help they can provide.





TSMX-T

3-Piece, Teflon* Lined, Heavy Duty



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSMX3T	TSMXL3T	.1900	.312	.250	1.250	.625	.437	.750	10-32	13	2,851	.028
TSMX4T	TSMXL4T	.2500	.375	.281	1.562	.750	.500	1.000	1/4-28	16	5,260	.043
TSMX5T	TSMXL5T	.3125	.437	.344	1.875	.875	.625	1.250	5/16-24	14	7,639	.072
TSMX6T	TSMXL6T	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	9,544	.112
TSMX7T	TSMXL7T	.4375	.562	.437	2.125	1.125	.812	1.375	7/16-20	14	10,285	.160
TSMX8T	TSMXL8T	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	16,238	.249
TSMX10T	TSMXL10T	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	17,955	.382
TSMX12T	TSMXL12T	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	28,081	.602

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

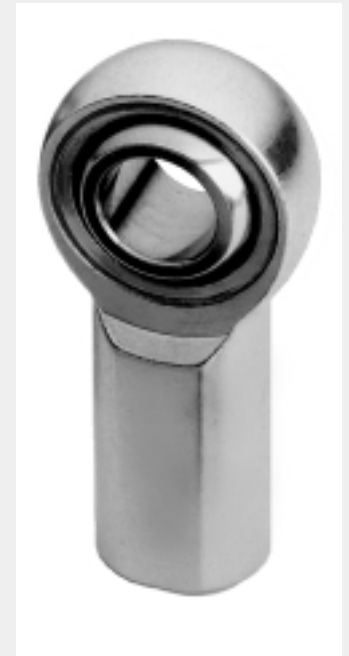
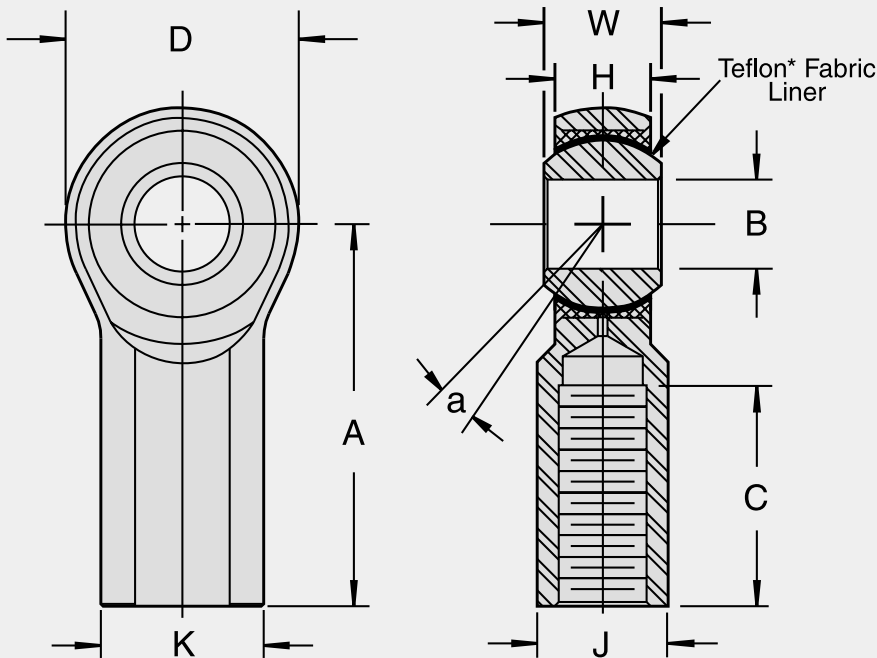
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: TSMX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

TSFX-T

3-Piece, Teflon* Lined, Heavy Duty



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±0.015	A ±0.015	D ±0.010	K ±0.010	J ±0.010	REF	C +0.062 -0.031	UNF-2B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Shank Diameter	Wrench Flat	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
TSFX3T	TSFXL3T	.1900	.312	.250	1.062	.625	.406	.312	.437	.500	10-32	13	3,733	.038
TSFX4T	TSFXL4T	.2500	.375	.281	1.312	.750	.469	.375	.500	.687	1/4-28	16	6,190	.059
TSFX5T	TSFXL5T	.3125	.437	.344	1.375	.875	.500	.437	.625	.687	5/16-24	14	7,639	.092
TSFX6T	TSFXL6T	.3750	.500	.406	1.625	1.000	.687	.562	.719	.812	3/8-24	12	9,544	.152
TSFX7T	TSFXL7T	.4375	.562	.437	1.812	1.125	.750	.625	.812	.937	7/16-20	14	10,285	.198
TSFX8T	TSFXL8T	.5000	.625	.500	2.125	1.312	.875	.750	.937	1.062	1/2-20	12	15,336	.329
TSFX10T	TSFXL10T	.6250	.750	.562	2.500	1.500	1.000	.875	1.125	1.375	5/8-18	16	17,955	.477
TSFX12T	TSFXL12T	.7500	.875	.687	2.875	1.750	1.125	1.000	1.312	1.562	3/4-16	14	28,081	.723

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

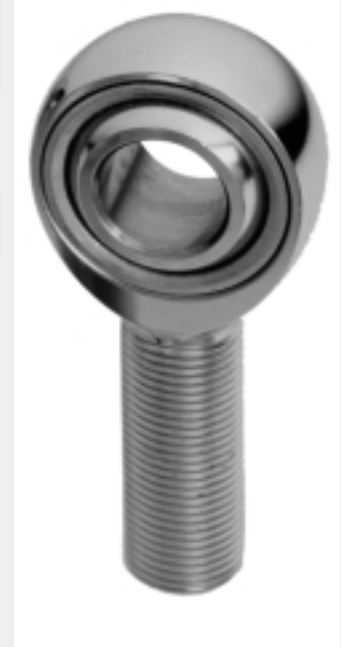
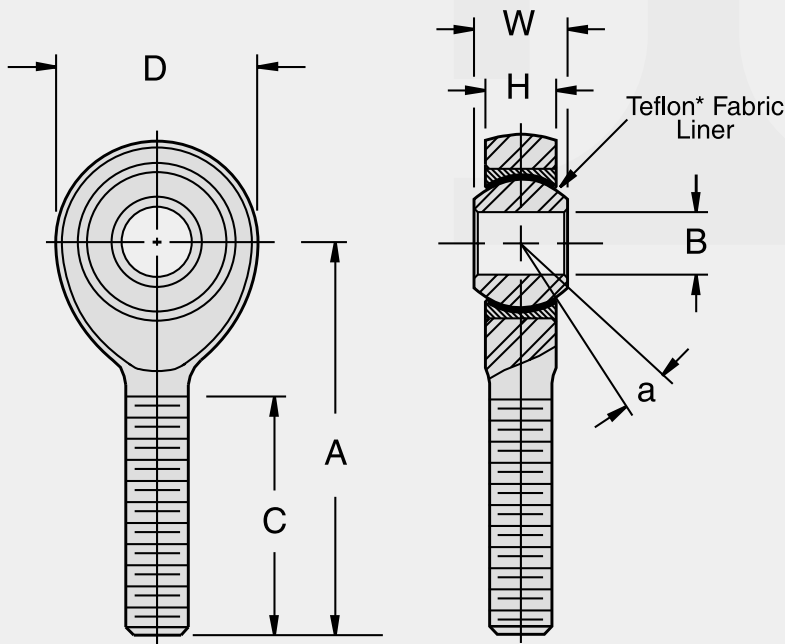
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: TSFX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

NSMX-T

3-Piece, Heavy Duty,
Teflon* Lined, Nickel Plated



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
NSMX6T	NSMXL6T	.3750	.500	.406	1.938	1.000	.719	1.250	3/8-24	12	9,544	.112
NSMX8T	NSMXL8T	.5000	.625	.500	2.438	1.312	.937	1.500	1/2-20	12	16,238	.249
NSMX10T	NSMXL10T	.6250	.750	.562	2.625	1.500	1.125	1.625	5/8-18	16	17,955	.382
NSMX12T	NSMXL12T	.7500	.875	.687	2.875	1.750	1.312	1.750	3/4-16	14	28,081	.602

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Bright Electroless Nickel Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

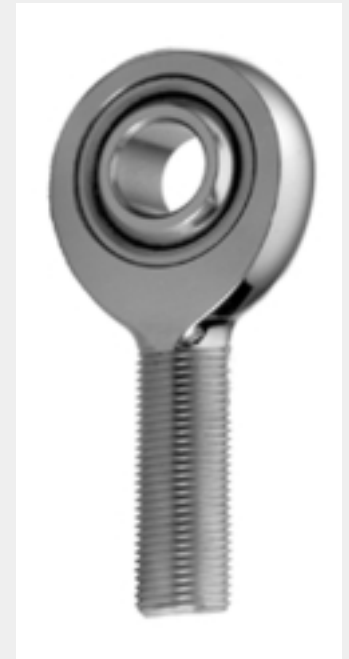
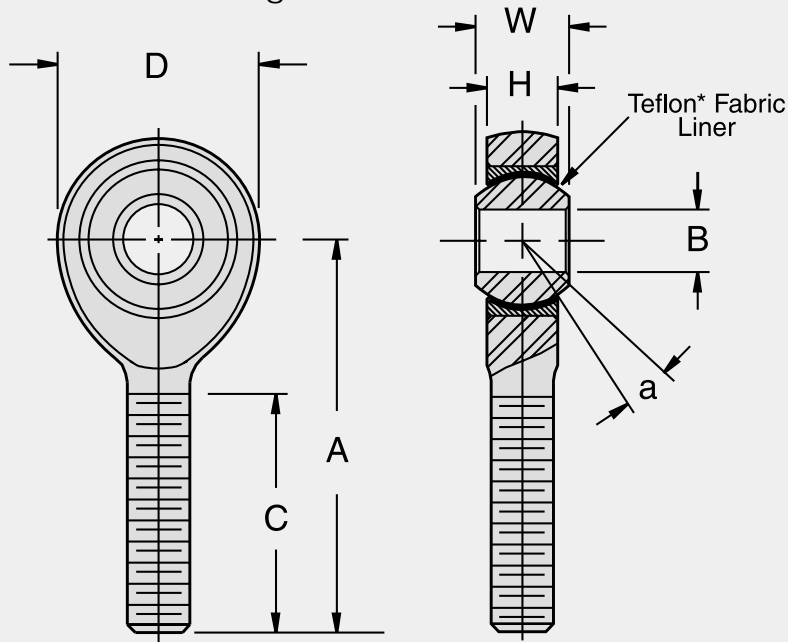
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: NSMX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

UMAX-T

3-Piece, Nickel Plated,
Ultimate Strength, Teflon* Lined



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.015	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
UMAX8T	UMAXL8T	.5000	.625	.500	2.625	1.500	.937	1.500	1/2-20	12	23,632	.34
UMAX10T	UMAXL10T	.6250	.750	.562	2.875	1.750	1.125	1.625	5/8-18	16	34,728	.52
UMAX12T	UMAXL12T	.7500	.875	.687	3.187	2.000	1.312	1.750	3/4-16	14	48,384	.80

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Bright Electroless Nickel Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

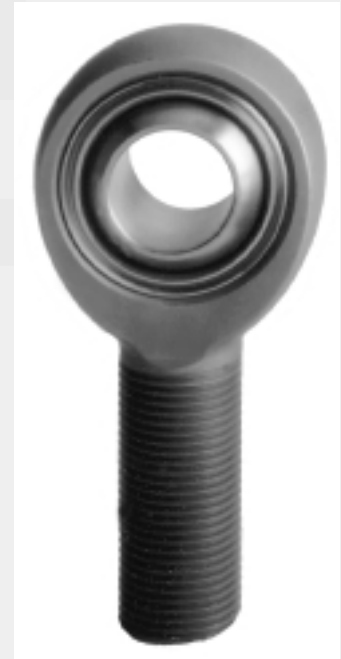
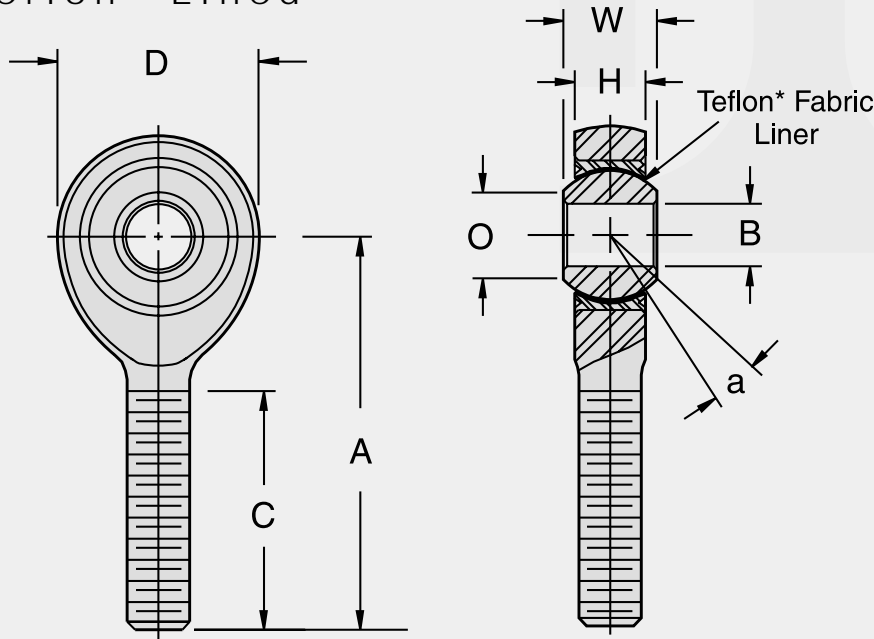
www.tuthill.com

TUTHILL
Linkage Group

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SSAM-T

3-Piece, Stainless Steel,
Teflon* Lined



Part Number		B +0.000 -0.005	W +0.000 -0.002	H ±.005	O REF	A ±.010	D ±.010	REF	C ±.031	UNF-3A	a*	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Ball Face Diameter	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSAM3T	SSAML3T	.1900	.437	.337	.337	1.562	.806	.531	.968	5/16-24	15	2,360	.072
SSAM4T	SSAML4T	.2500	.437	.337	.337	1.562	.806	.531	.968	5/16-24	15	4,860	.072
SSAM5T	SSAML5T	.3125	.437	.327	.327	1.875	.900	.593	1.187	5/16-24	14	7,180	.087
SSAM6T	SSAML6T	.3750	.500	.416	.416	1.938	1.025	.687	1.187	3/8-24	8	8,550	.136
SSAM7T	SSAML7T	.4375	.562	.452	.452	2.125	1.150	.781	1.281	7/16-20	10	12,000	.183
SSAM8T	SSAML8T	.5000	.625	.515	.515	2.438	1.337	.875	1.468	1/2-20	9	19,500	.278
SSAM10T	SSAML10T	.6250	.750	.577	.577	2.625	1.525	1.062	1.562	5/8-18	12	21,900	.424
SSAM12T	SSAML12T	.7500	.875	.640	.640	2.875	1.775	1.250	1.687	3/4-16	13	29,300	.639

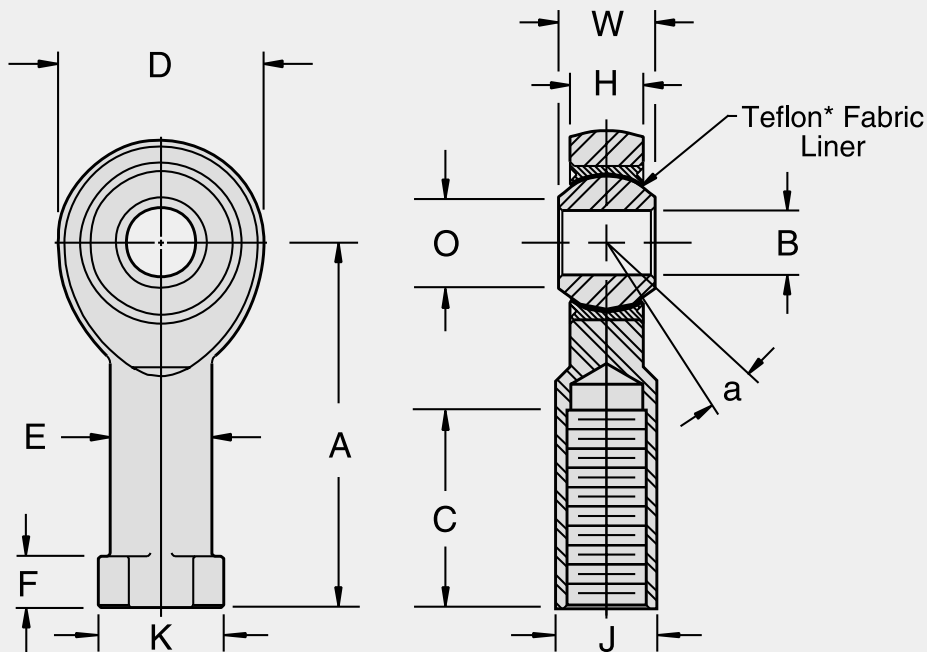
MATERIALS

Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSAF-T

3-Piece, Stainless Steel,
Teflon* Lined



Part Number		B +.0000 -.0005	W +.000 -.002	H ±.005	A ±.010	D ±.010	O REF	E ±.010	K REF	J +.002 -.010	F +.010 -.062	REF	C +.062 -.031	UNF-3B	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Body Width	C.L. Length	Head Diameter	Face Diameter	Shank Diameter	W.F. Diameter	W.F. Width	W.F. Length	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
SSAF3T	SSAFL3T	.1900	.437	.337	1.375	.806	.337	.422	.500	.437	.188	.531	.750	5/16-24	15	2,360	.080
SSAF4T	SSAFL4T	.2500	.437	.337	1.469	.806	.337	.422	.500	.437	.188	.531	.750	5/16-24	15	4,860	.084
SSAF5T	SSAFL5T	.3125	.437	.327	1.625	.900	.327	.485	.580	.500	.250	.593	.875	5/16-24	14	7,180	.102
SSAF6T	SSAFL6T	.3750	.500	.416	1.812	1.025	.416	.547	.660	.562	.250	.687	1.000	3/8-24	8	8,550	.161
SSAF7T	SSAFL7T	.4375	.562	.452	2.000	1.150	.452	.610	.720	.625	.250	.781	1.125	7/16-20	10	12,000	.212
SSAF8T	SSAFL8T	.5000	.625	.515	2.250	1.337	.515	.735	.880	.750	.250	.875	1.250	1/2-20	9	19,500	.325
SSAF10T	SSAFL10T	.6250	.750	.577	2.250	1.525	.577	.860	1.020	.875	.375	1.062	1.375	5/8-18	12	21,900	.481
SSAF12T	SSAFL12T	.7500	.875	.640	2.875	1.775	.640	.985	1.160	1.000	.375	1.250	1.625	3/4-16	13	29,300	.673

MATERIALS

Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

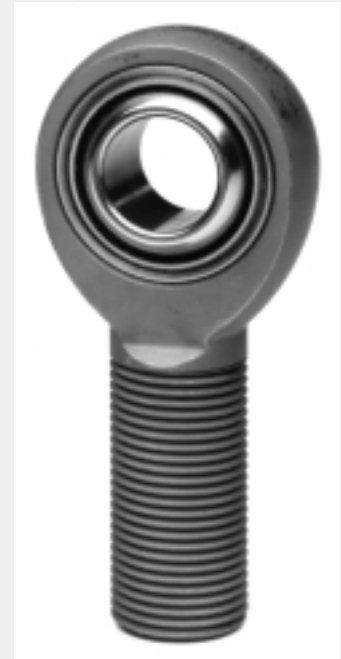
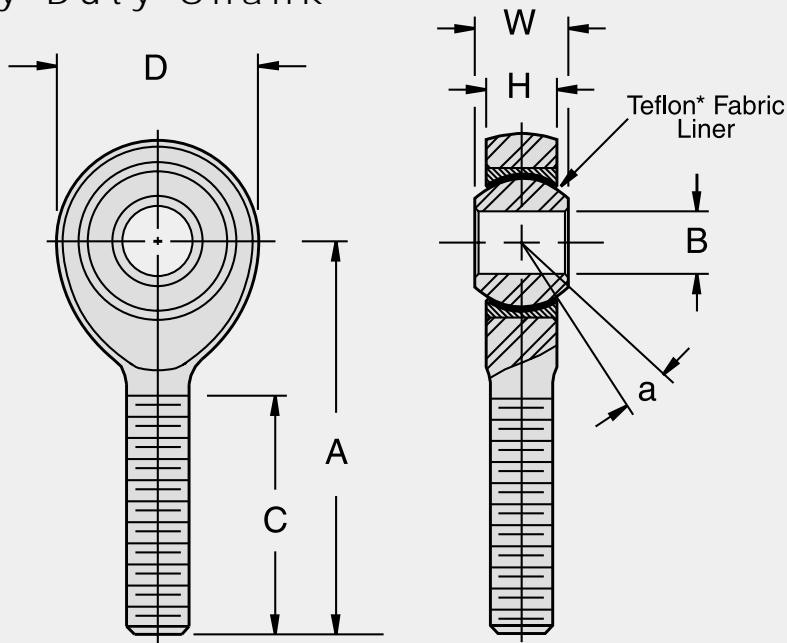
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Linkage Group

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SSHMT

3-Piece, Stainless Steel, Teflon* Lined,
Heavy Duty Shank



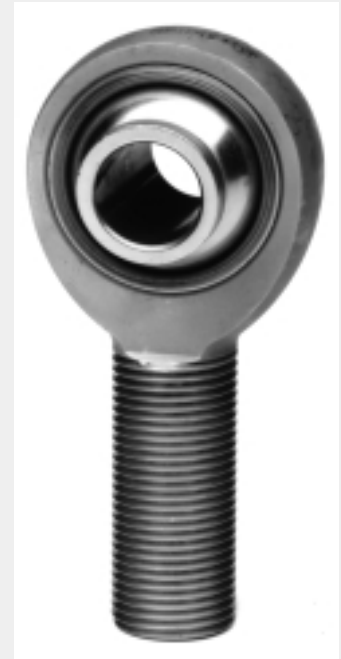
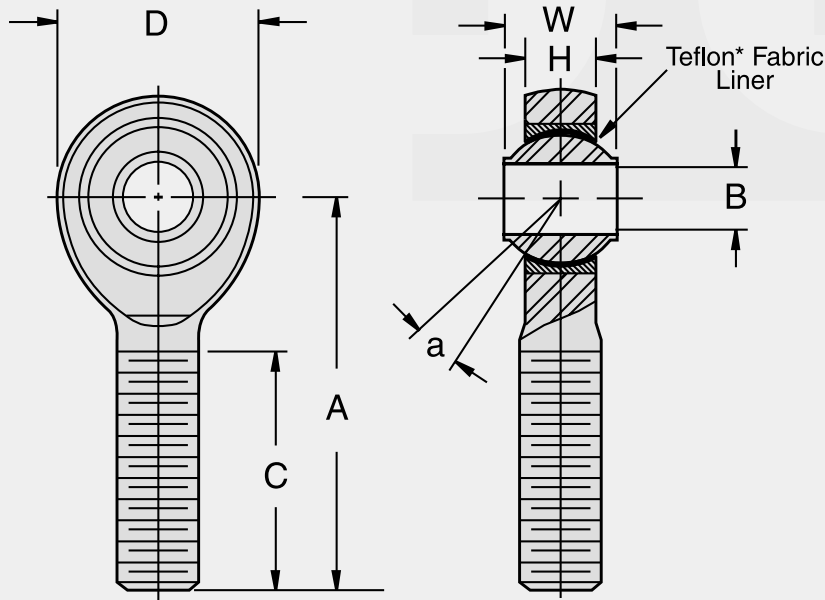
Part Number		B +0.000 -0.005	W +0.000 -0.002	A ±.010	D ±.010	REF	C MIN	UNF-3A	H ±.005	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Housing Width	Misalign. Angle		
SSHMT	SSHMLT	.2500	.375	1.562	.806	.531	.968	5/16-24	.375	5	7,550	.067
SSHMT	SSHMLT	.3125	.437	1.875	.900	.593	1.187	3/8-24	.401	14	9,200	.095
SSHMT	SSHMLT	.3750	.500	1.938	1.025	.687	1.187	7/16-20	.471	9	10,900	.140
SSHMT	SSHMLT	.4375	.562	2.125	1.150	.781	1.281	1/2-20	.542	10	14,050	.210
SSHMT	SSHMLT	.5000	.625	2.438	1.337	.875	1.468	5/8-18	.612	9	23,400	.330
SSHMT	SSHMLT	.6250	.750	2.625	1.525	1.062	1.562	3/4-16	.752	12	26,050	.480
SSHMT	SSHMLT	.7500	.875	2.875	1.775	1.250	1.687	7/8-14	.892	13	34,500	.730

MATERIALS			
Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

SSHMY-T

High Misalignment, 3-Piece, Stainless Steel, Teflon* Lined, Heavy Duty Shank



Part Number		B +0.015 -0.005	W +0.000 -0.005	A ±.010	D ±.010	REF	C +0.062 -0.031	UNF-3A	H ±.005	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Housing Width	Misalign. Angle		
SSHMY4T	SSHMYL4T	.2500	.593	1.938	1.000	.593	1.250	3/8-24	.265	23	8,650	.11
SSHMY5T	SSHMYL5T	.3125	.813	2.125	1.125	.781	1.375	7/16-20	.355	22	9,050	.16
SSHMY6T	SSHMYL6T	.3750	.813	2.125	1.125	.781	1.375	7/16-20	.355	22	9,050	.15
SSHMY7T	SSHMYL7T	.4375	.875	2.438	1.312	.875	1.500	1/2-20	.355	21	14,100	.25
SSHMY8T	SSHMYL8T	.5000	.937	2.625	1.500	1.000	1.625	5/8-18	.411	19	19,800	.39
SSHMY10T	SSHMYL10T	.6250	1.200	2.875	1.750	1.250	1.750	3/4-16	.577	19	26,500	.62
SSHMY12T	SSHMYL12T	.7500	1.280	3.375	2.000	1.375	1.875	7/8-14	.630	18	34,200	.90

MATERIALS			
Ball	Body	Race	Liner
440c Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

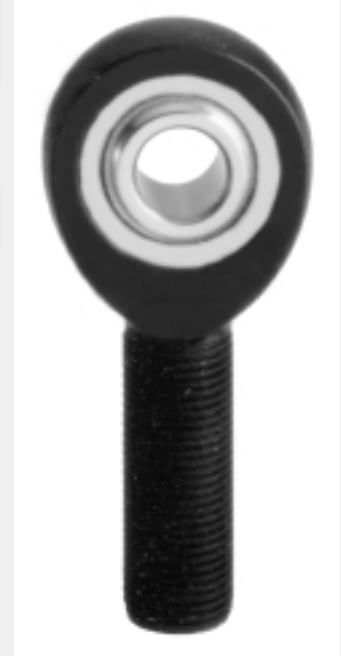
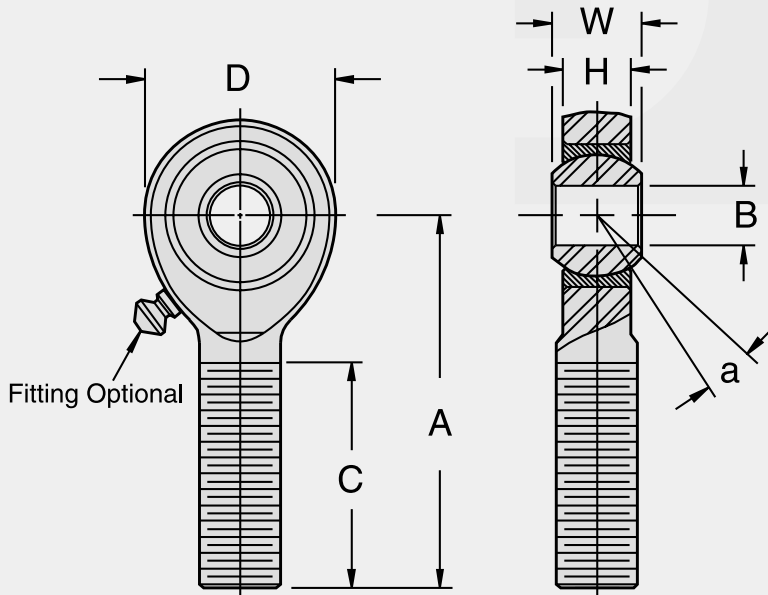
www.tuthill.com

TUTHILL
Linkage Group

44

KCAX

3-Piece, Aluminum, Metal to Metal,
Heavy Duty Shank



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCAX5	KCAXL5	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,589	.06
KCAX6	KCAXL6	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,539	.10
KCAX7	KCAXL7	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	10,101	.14
KCAX8	KCAXL8	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	13,447	.20
KCAX10	KCAXL10	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	17,393	.32

MATERIALS

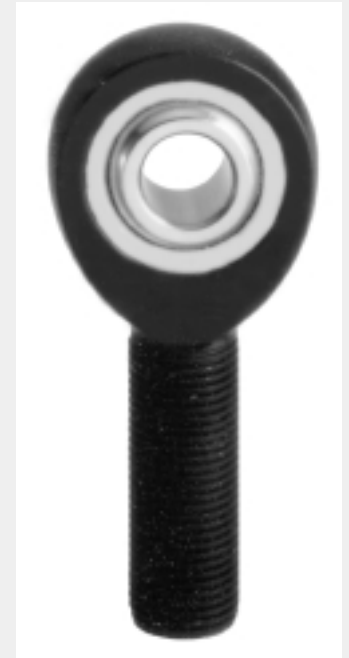
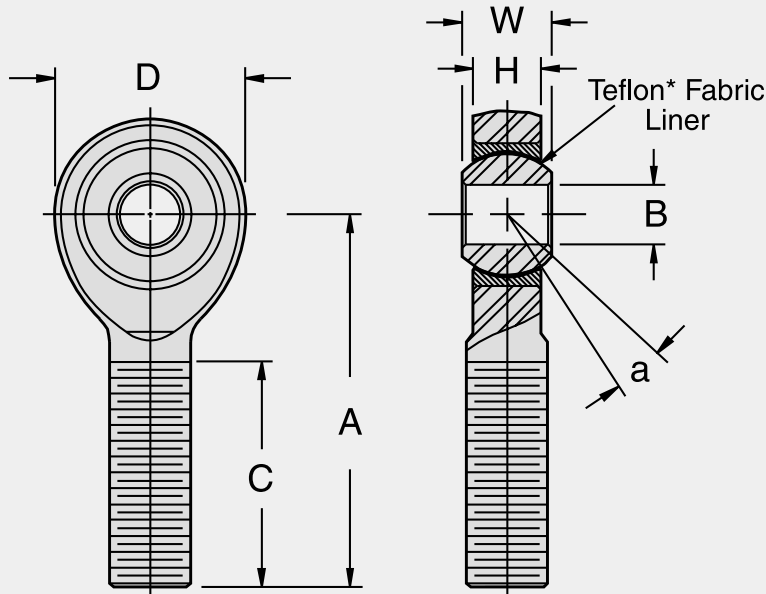
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Black Anodized	Low Carbon Steel Heat Treated Zinc Plated Clear Chromate Treated

NOTES:

1. For standard zerk lubrication fitting add "Z" to suffix. Example: KCAX8Z
2. This series is also available in a studed configuration.
(Refer to chart in this catalog on page 66) Specify by adding "S" to suffix.
Example: KCAX8S

KCAX-T

3-Piece, Aluminum, Teflon* Lined,
Heavy Duty Shank



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a*	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
KCAX5T	KCAXL5T	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,589	.06
KCAX6T	KCAXL6T	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,539	.10
KCAX7T	KCAXL7T	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	10,101	.14
KCAX8T	KCAXL8T	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	13,447	.20
KCAX10T	KCAXL10T	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	17,393	.32

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	7075-T6 High Strength Aluminum Black Anodized	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

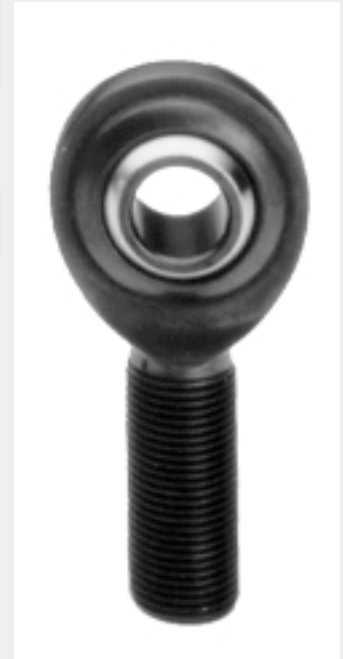
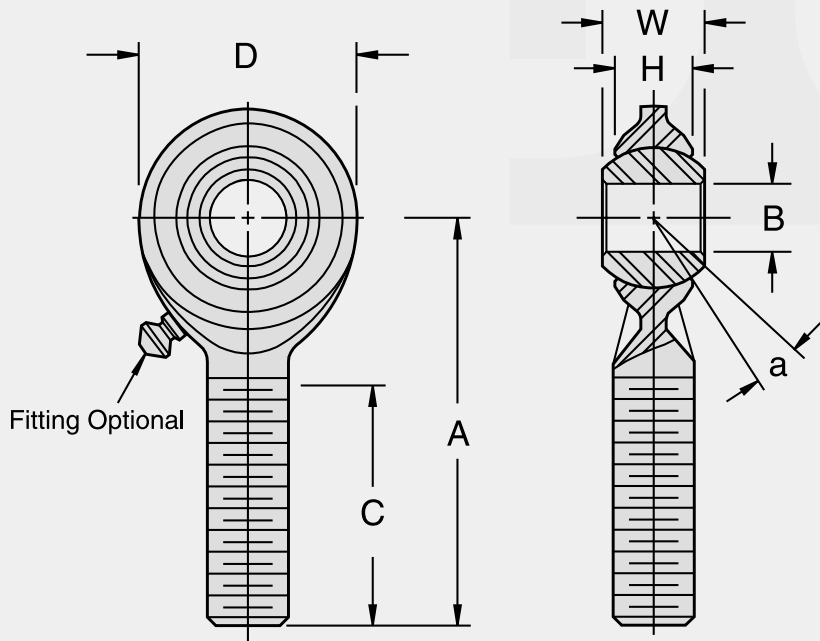
NOTES:

1. This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: KCAX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

XMAX

2-Piece, Metal to Metal, Heavy Duty Shank, Heat Treated Alloy Steel



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H REF	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
XMAX8	XMAXL8	.5000	.625	.453	2.625	1.500	.937	1.625	5/8-18	22	19,232	.30
XMAX10	XMAXL10	.6250	.750	.484	2.875	1.750	1.125	1.750	3/4-16	18	26,400	.48

MATERIALS

Ball

52100 Steel
Rc 56 Min.
Hard Chrome Plated

Body

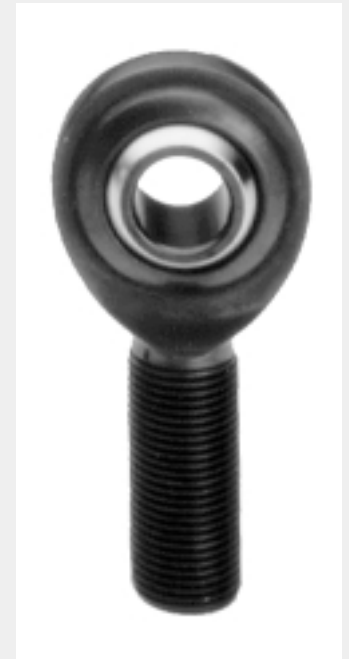
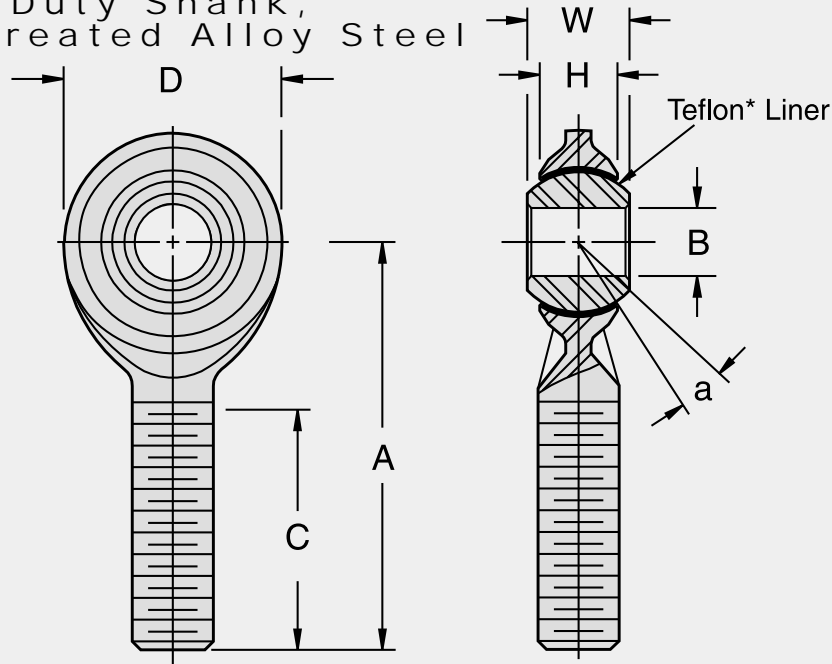
Alloy Steel
Heat Treated
Black Oxide Coated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix.
Example: XMAX8Z
- This series is also available in a studded configuration.
(Refer to chart in this catalog on page 66).
Specify by adding "S" to suffix.
Example: XMAX8S

XMAX-T

2-Piece, Teflon* Lined,
Heavy Duty Shank,
Heat Treated Alloy Steel



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H REF	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
XMAX8T	XAMXL8T	.5000	.625	.453	2.625	1.500	.875	1.625	5/8-18	22	19,232	.30
XMAX10T	XAMXL10T	.6250	.750	.484	2.875	1.750	1.062	1.750	3/4-16	18	26,400	.48

MATERIALS		
Ball	Body	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Black Oxide Coated	Teflon* Permanently Bonded to Body I.D.

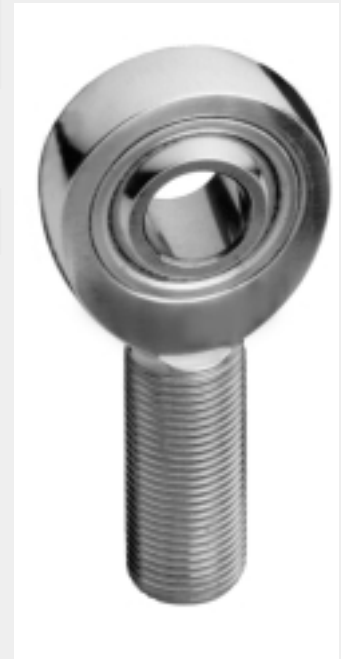
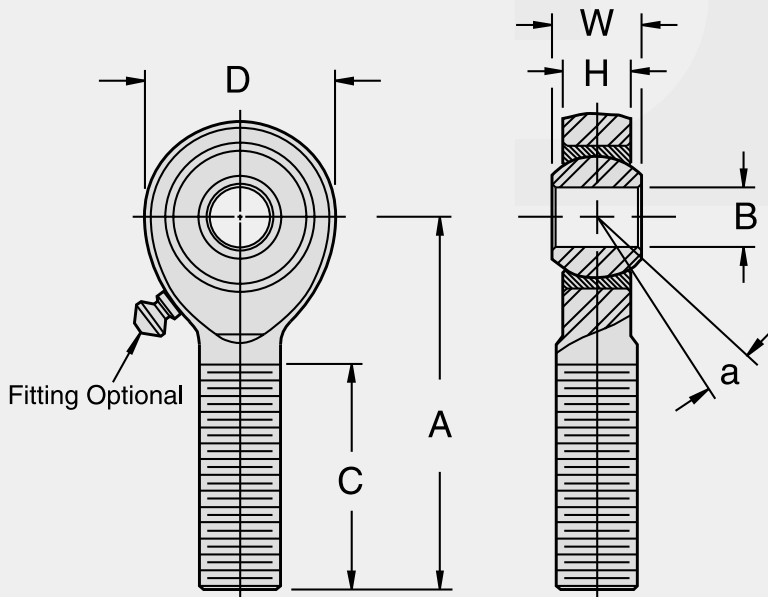
NOTES:

1. This series is also available in a studded configuration.
(Refer to chart in this catalog on page 66) Specify by adding "S" to suffix.
Example: XMAX8TS

*A trademark of E.I. DuPont de Nemours & Co., inc.

RM

3-Piece, Metal to Metal, Extra Strength, Heavy Duty Shank



Part Number		B +0.0025 -0.0005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RM3	RML3	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	2,158	.043
RM4	RML4	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	3,467	.072
RM5	RML5	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,323	.112
RM6	RML6	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,180	.160
RM7	RML7	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	9,620	.249
RM8	RML8	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	12,807	.382
RM10	RML10	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	16,565	.602
RM12	RML12	.7500	.875	.687	3.375	2.000	1.312	1.875	7/8-14	12	22,803	.920

MATERIALS

Ball

52100 Steel
Rc 56 Min.
Hard Chrome Plated

Body

Low Carbon Steel
Zinc Plated
Clear Chromate
Treated

Race

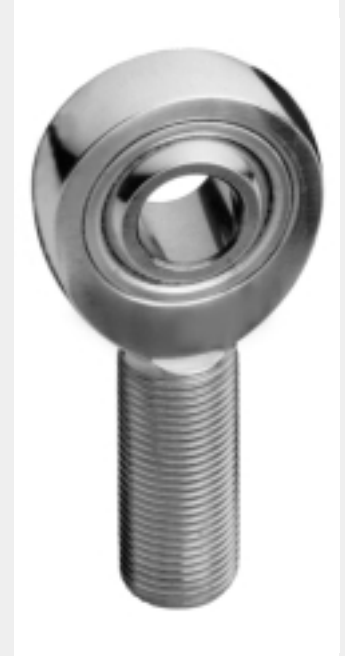
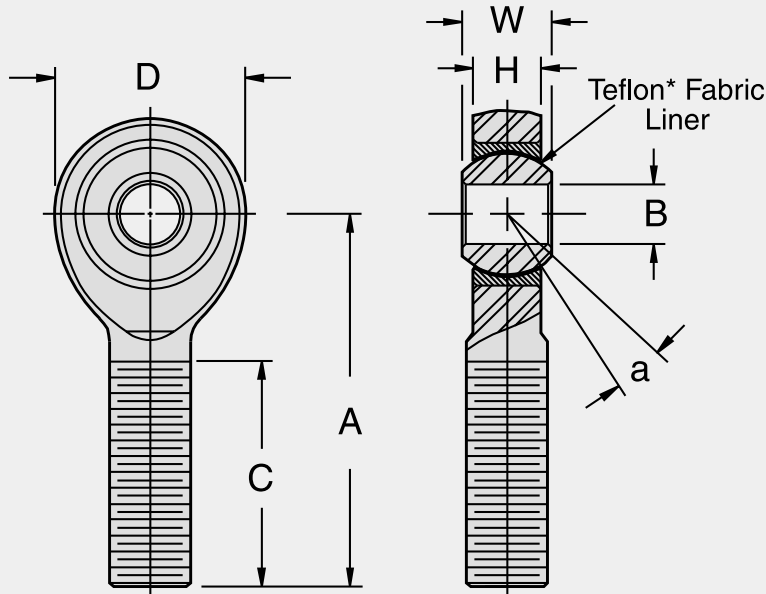
Alloy Steel
Heat Treated
Zinc Plated
Clear Chromate
Treated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix. Example: RM8Z
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: RM8S

RM-T

3-Piece, Teflon* Lined, Extra Strength, Heavy Duty Shank



Part Number		B +0.025 -0.005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RM3T	RML3T	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	2,158	.043
RM4T	RML4T	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	3,467	.072
RM5T	RML5T	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	5,323	.112
RM6T	RML6T	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	7,180	.160
RM7T	RML7T	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	9,620	.249
RM8T	RML8T	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	12,807	.382
RM10T	RML10T	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	16,565	.602
RM12T	RML12T	.7500	.875	.687	3.375	2.000	1.312	1.875	7/8-14	12	22,803	.920

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

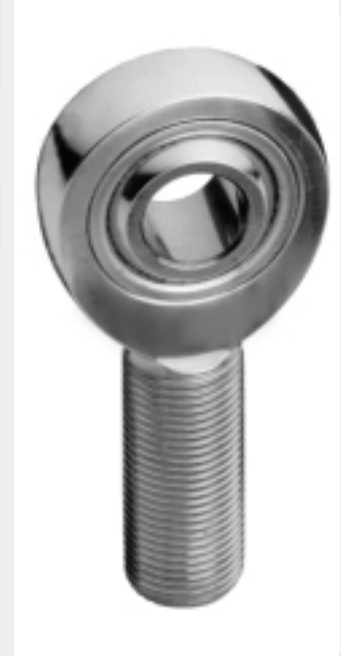
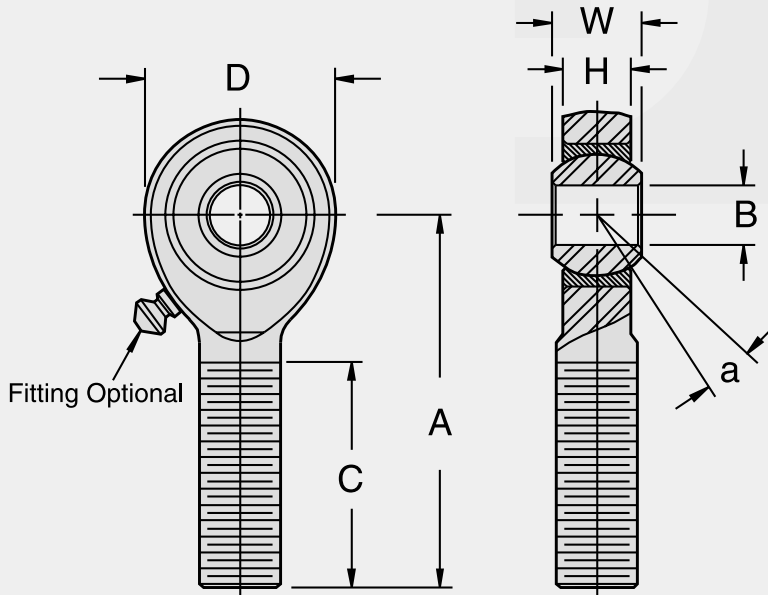
NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: RM8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

RMX

3-Piece, Metal to Metal, Alloy Steel,
Heavy Duty Shank



Part Number		B +0.025 -0.005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RMX3	RMXL3	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	5,260	.043
RMX4	RMXL4	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	8,452	.072
RMX5	RMXL5	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	12,978	.112
RMX6	RMXL6	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	17,508	.160
RMX7	RMXL7	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	23,452	.249
RMX8	RMXL8	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	31,390	.382
RMX10	RMXL10	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	40,572	.602

MATERIALS

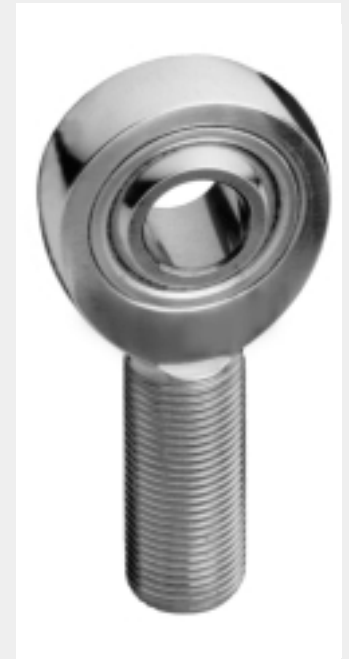
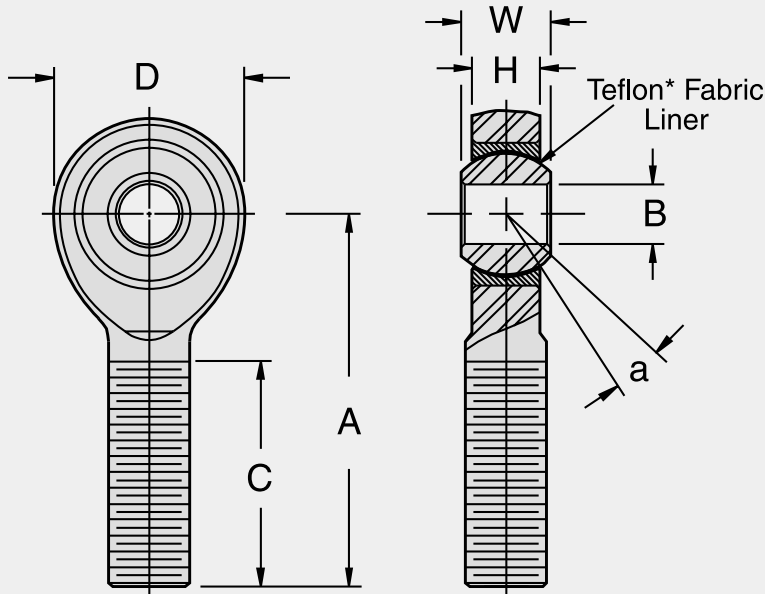
Ball	Body	Race
52100 Steel Rc 56 Min. Hard Chrome Plated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated	Alloy Steel Heat Treated Zinc Plated Clear Chromate Treated

NOTES:

- For standard zerklubrication fitting add "Z" to suffix. Example: RMX8Z
- This series is also available in a studded configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: RMX8S

RMX-T

3-Piece, Teflon* Lined, Alloy Steel, Heavy Duty Shank



Part Number		B +0.025 -0.005	W +0.000 -0.005	H ±.005	A ±.015	D ±.010	REF	C +0.062 -0.031	UNF-3A	a°	Ultimate Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
Right Hand	Left Hand	Ball Bore	Ball Width	Housing Width	Centerline Length	Head Diameter	Ball Diameter	Thread Length	Thread Size	Misalign Angle		
RMX3T	RMXL3T	.1900	.312	.250	1.562	.750	.437	1.000	1/4-28	10	5,260	.043
RMX4T	RMXL4T	.2500	.375	.281	1.875	.875	.500	1.250	5/16-24	13	8,452	.072
RMX5T	RMXL5T	.3125	.437	.344	1.938	1.000	.625	1.250	3/8-24	12	12,978	.112
RMX6T	RMXL6T	.3750	.500	.406	2.125	1.125	.719	1.375	7/16-20	10	17,508	.160
RMX7T	RMXL7T	.4375	.562	.437	2.438	1.312	.812	1.500	1/2-20	12	23,452	.249
RMX8T	RMXL8T	.5000	.625	.500	2.625	1.500	.937	1.625	5/8-18	10	31,390	.382
RMX10T	RMXL10T	.6250	.750	.562	2.875	1.750	1.125	1.750	3/4-16	13	40,572	.602

MATERIALS			
Ball	Body	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Steel Alloy Heat Treated Zinc Plated Clear Chromate Treated	Low Carbon Steel Zinc Plated Clear Chromate Treated	Teflon* Fabric Permanently Bonded to Race I.D.

NOTES:

1. This series is also available in a studed configuration. (Refer to chart in this catalog on page 66) Specify by adding "S" to suffix. Example: RMX8TS

*A trademark of E.I. DuPont de Nemours & Co., Inc.

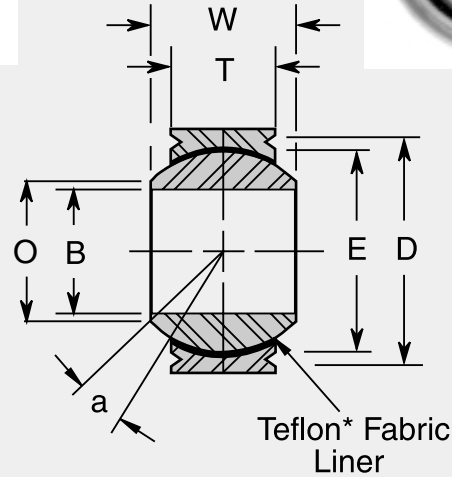
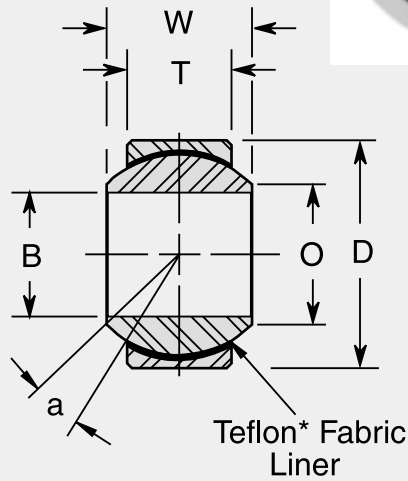
WSSB, WSSB-V

Stainless Steel, Swaged Race, Teflon* Lined

WSSB



WSSB-V



Part Number	B +0.000 -0.005	D +0.000 -0.005	W +0.000 -0.002	T ±.005	E +0.000 -0.010	O REF	REF	a°	Static Radial Limit Load (Pounds)	Static Axial Limit Load (Pounds)	Dynamic Oscillating Radial Load (Pounds)	Approx. Weight (Pounds)
	Ball Bore	Outside Diameter	Ball Width	Race Width	"V" Groove Diameter	Ball Flat Diameter	Ball Diameter	Misalign. Angle				
WSSB3 WSSB3V	.1900	.6250	.437	.327	.565	.301	.531	15	9,000	1,770	3,770	.031
WSSB4 WSSB4V	.2500	.6250	.437	.327	.565	.301	.531	15	9,000	1,770	3,770	.031
WSSB5 WSSB5V	.3125	.6875	.437	.317	.627	.401	.593	14	9,400	1,640	4,650	.035
WSSB6 WSSB6V	.3750	.8125	.500	.406	.714	.471	.687	8	13,700	2,630	6,390	.060
WSSB7 WSSB7V	.4375	.9375	.562	.442	.839	.542	.781	10	20,700	3,650	9,390	.080
WSSB8 WSSB8V	.5000	1.0000	.625	.505	.902	.612	.875	9	27,500	4,970	12,150	.100
WSSB10 WSSB10V	.6250	1.1875	.750	.567	1.089	.752	1.062	12	39,000	6,130	16,700	.160
WSSB12 WSSB12V	.7500	1.3750	.875	.630	1.253	.892	1.250	13	52,300	7,730	22,100	.240
WSSB14 WSSB14V	.8750	1.6250	.875	.755	1.503	1.061	1.375	6	67,300	10,800	28,200	.350
WSSB16 WSSB16V	1.0000	2.1250	1.375	1.005	2.003	1.275	1.875	12	137,000	19,300	53,700	.970

MATERIALS

Ball	Race	Liner
440c Stainless Steel Rc 56 Min.	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

This series is also available with an optional 52100 heat treated and hard chrome plated ball. To specify this configuration use p/n WSBT(3-16) or WSBT(3-16)V in place of part numbers in table.

*A trademark of E.I. DuPont de Nemours & Co.

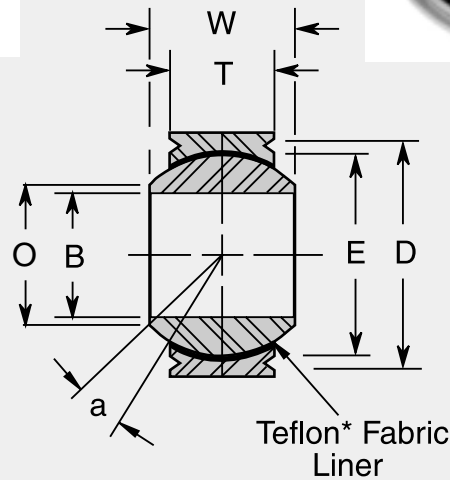
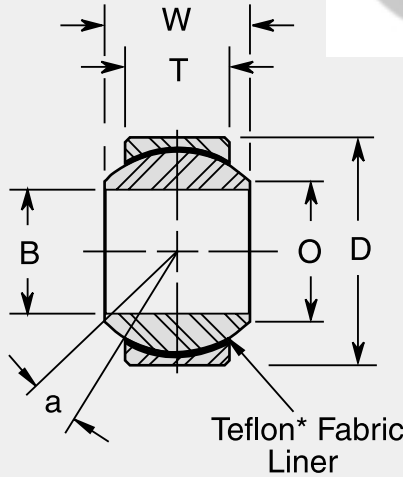
NSSB, NSSB-V

Stainless Steel, Swaged Race, Teflon* Lined

NSSB



NSSB-V



Part Number	B +0.000 -0.005	D +0.000 -0.005	W +0.000 -0.005	T ±.005	E +0.000 -0.010	O REF	REF	a*	Static Radial Limit Load (Pounds)	Static Axial Limit Load	Dynamic Oscillating Radial Load (Pounds)	Approx. Weight (Pounds)	
	Ball Bore	Outside Diameter	Ball Width	Race Width	"V" Groove Diameter	Ball Flat Diameter	Ball Diameter	Misalign Angle					
NSSB3	NSSB3V	.1900	.5625	.281	.218	.502	.293	.406	10	3,975	150	1,500	.020
NSSB4	NSSB4V	.2500	.6562	.343	.250	.596	.364	.500	10	6,040	430	2,320	.020
NSSB5	NSSB5V	.3125	.7500	.375	.281	.652	.419	.562	10	8,750	700	3,430	.030
NSSB6	NSSB6V	.3750	.8125	.406	.312	.714	.515	.656	9	10,540	1,100	4,200	.040
NSSB7	NSSB7V	.4375	.9062	.437	.343	.808	.570	.718	8	13,200	1,400	5,700	.050
NSSB8	NSSB8V	.5000	1.0000	.500	.390	.878	.641	.813	8	17,900	2,100	7,900	.070
NSSB10	NSSB10V	.6250	1.1875	.625	.500	1.065	.739	.968	8	30,500	4,720	13,400	.120
NSSB12	NSSB12V	.7500	1.4375	.750	.593	1.315	.920	1.187	8	46,400	6,750	19,700	.210
NSSB14	NSSB14V	.8750	1.5625	.875	.703	1.440	.978	1.312	8	62,200	9,350	26,100	.270
NSSB16	NSSB16V	1.0000	1.7500	1.000	.797	1.628	1.118	1.500	9	82,200	12,160	34,100	.390

MATERIALS

* Ball	Race	Liner
440c Stainless Steel Rc 56 Min.	17-4 PH Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

This series is also available with an optional 52100 heat treated and hard chrome plated ball. To specify this configuration use p/n NSBT(3-16) or NSBT(3-16)V in place of part numbers in table.

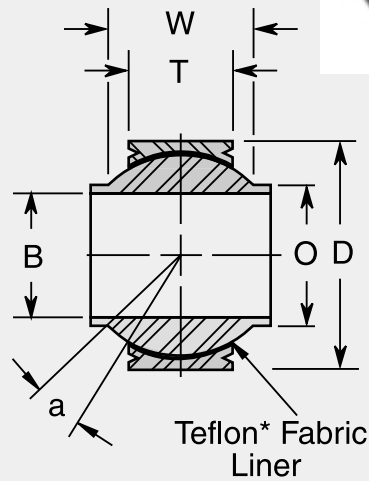
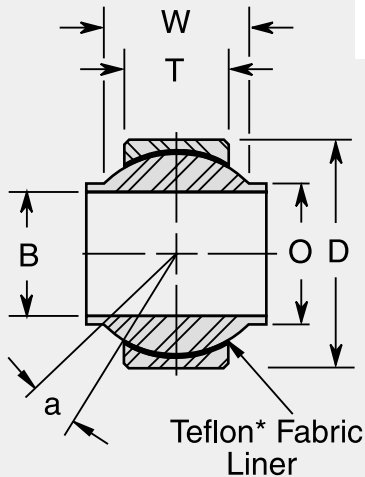
YSSB, YSSB-V

High Misalignment Teflon* Lined Series

YSSB



YSSB-V



Part Number	B +0.000 -0.005	D +0.000 -0.005	W +0.000 -0.002	T ±.005	O +0.000 -0.010	REF	a°	Static Radial Limit Load (Pounds)	Static Axial Limit Load (Pounds)	Dynamic Oscillating Radial Load (Pounds)	Approx. Weight (Pounds)	
	Ball Bore	Outside Diameter	Ball Width	Race Width	Shoulder Diameter	Ball Diameter	Misalign Angle					
YSSB4	YSSB4V	.2500	.7400	.593	.255	.390	.593	24	7,100	450	3,800	.036
YSSB5	YSSB5V	.3125	.6875	.625	.255	.418	.593	20	9,000	450	3,800	.025
YSSB6	YSSB6V	.3750	.9060	.813	.345	.512	.781	23	16,000	2,000	7,200	.068
YSSB7	YSSB7V	.4375	1.0000	.875	.345	.618	.875	22	19,300	2,000	8,100	.095
YSSB8	YSSB8V	.5000	1.1250	.937	.401	.730	1.000	20	26,100	3,200	10,900	.159
YSSB10	YSSB10V	.6250	1.3750	1.200	.567	.856	1.250	20	44,500	7,000	20,000	.245
YSSB12	YSSB12V	.7500	1.5625	1.280	.620	.970	1.375	18	54,800	8,700	24,200	.315

MATERIALS

* Ball	Race	Liner
440c Stainless Steel Rc 56 Min.	17-4 Stainless Steel Heat Treated	Teflon* Fabric Permanently Bonded to Race I.D.

* This series is also available with an optional 52100 heat treated and hard chrome plated ball. To specify this configuration use p/n YSBT(4-12) or YSBT(4-12)V in place of part numbers in table.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

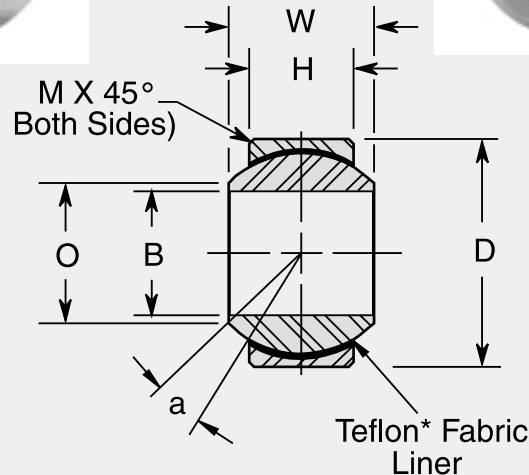
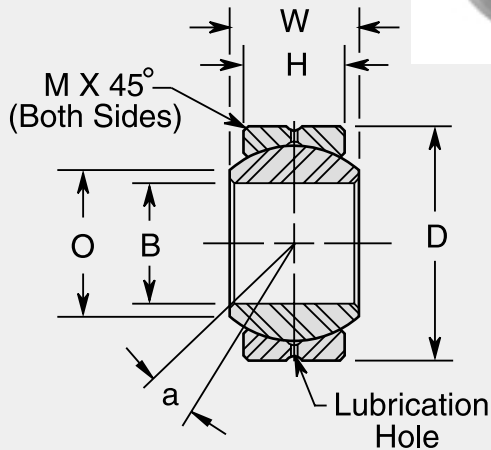
COM, COM-T

Low Carbon Steel, Metal to Metal/Teflon* Lined

COM



COM-T



Part Number	B <small>+0.015 -0.005</small>	D <small>+0.000 -0.007</small>	H <small>±.005</small>	W <small>±.005</small>	O REF	M REF	a° REF	Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)		
	Ball Bore	Outside Diameter	Race Width	Ball Width	Ball Flat Diameter	O.D. Chamfer	Ball Diameter	Misalign Angle			
COM3	COM3T	.1900	.5625	.218	.281	.293	.015	.406	11.0	3,250	.014
COM4	COM4T	.2500	.6562	.250	.343	.364	.022	.500	13.5	4,950	.022
COM5	COM5T	.3125	.7500	.281	.375	.419	.032	.562	12.0	6,475	.030
COM6	COM6T	.3750	.8125	.312	.406	.516	.032	.656	10.0	8,400	.038
COM7	COM7T	.4375	.9062	.343	.437	.569	.032	.687	13.0	10,200	.048
COM8	COM8T	.5000	1.0000	.390	.500	.640	.032	.781	9.5	13,250	.065
COM10	COM10T	.6250	1.1875	.500	.625	.780	.032	.968	8.5	21,280	.110
COM12	COM12T	.7500	1.4375	.593	.750	.920	.044	1.187	9.0	31,920	.204
COM14	COM14T	.8750	1.5625	.703	.875	.980	.044	1.312	9.5	41,960	.263
COM16	COM16T	1.0000	1.7500	.797	1.000	1.118	.044	1.500	10.0	55,200	.386

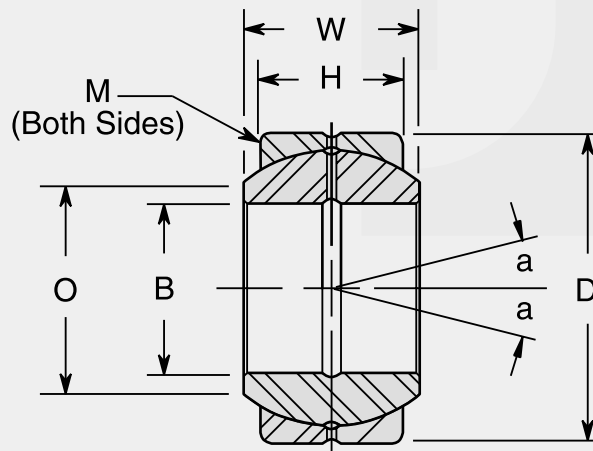
MATERIALS

Ball	Race	Liner
52100 Steel Rc 56 Min. Hard Chrome Plated	Low Carbon Steel Oil Coated	Teflon* Fabric Permanently Bonded to Race I.D.

*A trademark of E.I. DuPont de Nemours & Co., Inc.

GEZ

Metal to Metal, Fractured Race



Part Number	B +0.000 -0.005	D +0.000 -0.005	H +0.000 -0.005	W +0.000 -0.005	O REF	M Min.	REF	a°	Maximum Radial Static Load Capacity (Pounds)	Approx. Weight (Pounds)
	Ball Bore	Outside Diameter	Race Width	Ball Width	Ball Flat Diameter	Race Fillet	Ball Diameter	Misalign Angle		
GEZ12ES	.5000	.8750	.375	.437	.551	.032	.709	6.0	9,330	.044
GEZ15ES	.6250	1.0625	.469	.547	.703	.040	.906	6.0	14,726	.079
GEZ19ES	.7500	1.2500	.562	.656	.844	.040	1.083	6.0	21,358	.126
GEZ22ES	.8750	1.4375	.656	.765	.974	.040	1.260	6.0	28,552	.193
GEZ25ES	1.0000	1.6250	.750	.875	1.103	.040	1.417	6.0	37,320	.276
GEZ31ES	1.2500	2.0000	.937	1.093	1.382	.040	1.772	6.0	58,543	.516
GEZ34ES	1.3750	2.1875	1.031	1.187	1.516	.040	1.929	6.0	69,694	.770
GEZ38ES	1.5000	2.4375	1.125	1.312	1.703	.040	2.165	6.0	84,308	.934
GEZ44ES	1.7500	2.8125	1.312	1.531	1.984	.040	2.520	6.0	114,658	1.430
GEZ50ES	2.0000	3.1875	1.500	1.750	2.266	.048	2.874	6.0	150,629	2.070
GEZ63ES	2.5000	3.9375	1.875	2.187	2.833	.048	3.583	6.0	236,061	4.090
GEZ69ES	2.7500	4.3750	2.062	2.406	3.110	.048	3.937	6.0	281,025	5.380
GEZ76ES	3.0000	4.7500	2.250	2.625	3.406	.048	4.331	6.0	337,230	6.870

MATERIALS

Ball

Carbon Chromium Steel
Hardened, Ground and
Phosphated. Sliding Surface
Treated with MoS₂

Race

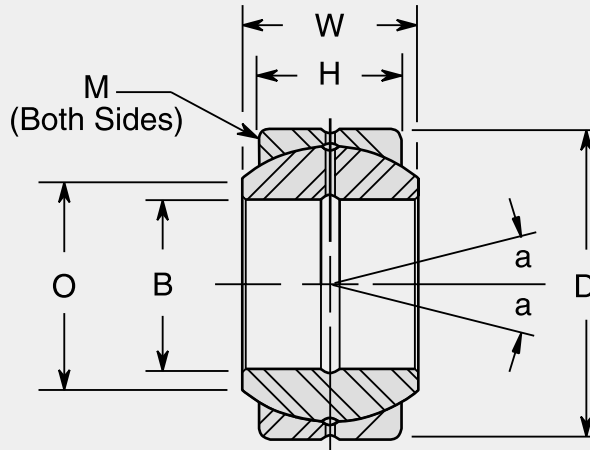
Carbon Chromium Steel,
Fractured, Hardened, Ground
and Phosphated. Sliding surface
treated with MoS₂

NOTES:

1. Dimension precision for GEZ series spherical bearings is before splitting the outer race and before coating inner and outer components.

GE

Metal to Metal, Fractured Race Metric



Part Number	B <small>+0.000 -0.127</small>	D <small>+0.000 -0.177</small>	H <small>+0.00 -0.127</small>	W <small>+0.00 -0.127</small>	O REF	M Min.	REF	a° Misalign Angle	Maximum Radial Static Load Capacity (Newtons)	Approx. Weight (Kilograms)
	Ball Bore	Outside Diameter	Race Width	Ball Width	Ball Flat Diameter	Race Fillet	Ball Diameter			
GE30ES	30	47	18	22	34	0.6	40.7	6	310,000	0.16
GE40ES	40	62	22	28	45	1.0	53.0	7	500,000	0.32
GE45ES	45	68	25	32	50	1.0	60.0	7	640,000	0.46
GE50ES	50	75	28	35	55	1.0	66.0	6	780,000	0.56

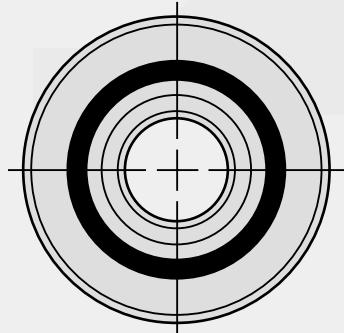
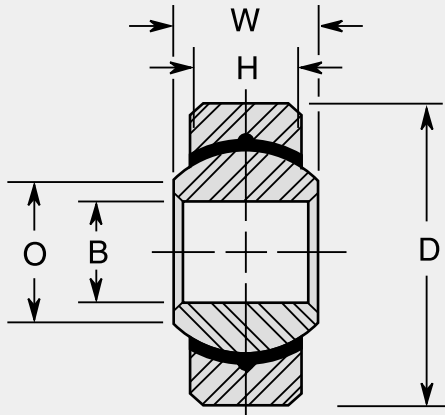
MATERIALS	
Ball	Race
Carbon Chromium Steel Hardened, Ground and Phosphated. Sliding Surface Treated with MoS ₂	Carbon Chromium Steel, Fractured, Hardened, Ground and Phosphated. Sliding surface treated with MoS ₂

NOTES:

1. Dimension precision for GE series spherical bearings is before splitting the outer race and before coating inner and outer components.

J, JM

Metric/Inch Molded Race Spherical Bearings



INCHES Part Number	B $\begin{smallmatrix} +.0020 \\ -.0005 \end{smallmatrix}$	D $\begin{smallmatrix} +.0 \\ -.0005 \end{smallmatrix}$	H $\begin{smallmatrix} +.0 \\ -.005 \end{smallmatrix}$	W $\pm .0005$	O REF	Ultimate Radial Static Load Capacity (Pounds)
	Ball Bore	Outside Diameter	Race Width	Ball Width	Ball Flat Diameter	
J03	.1900	.5625	.218	.281	.293	1,102
J04	.2500	.6562	.250	.343	.364	1,607
J05	.3125	.7500	.281	.375	.419	2,700
J06	.3750	.8125	.343	.406	.475	2,943
J07	.4375	.9062	.312	.437	.530	3,619
J08	.5000	1.0000	.390	.500	.600	4,328
J10	.6250	1.1875	.500	.625	.739	6,800

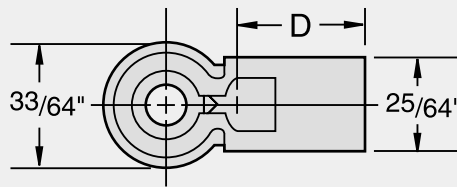
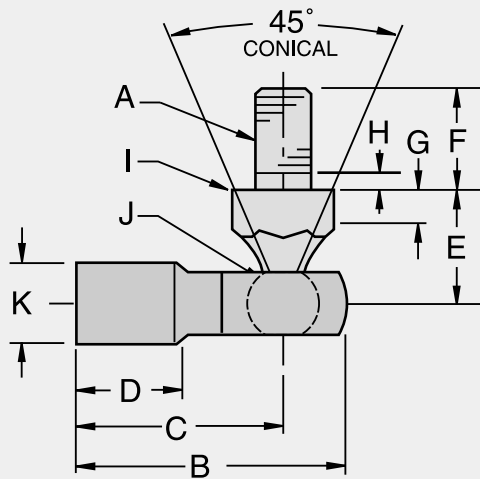
MILLIMETERS Part Number	B $\begin{smallmatrix} +.063 \\ -.013 \end{smallmatrix}$	D $\begin{smallmatrix} +.0 \\ -.013 \end{smallmatrix}$	H $\begin{smallmatrix} +.0 \\ -.1 \end{smallmatrix}$	W $\pm .013$	O REF	Ultimate Radial Static Load Capacity (Newtons)
	Ball Bore	Outside Diameter	Race Width	Ball Width	Ball Flat Diameter	
J03M	3	12	4.50	6	5.20	3,040
J05M	5	16	6.00	8	7.50	5,340
J06M	6	18	6.75	9	9.30	7,720
J08M	8	22	9.00	12	10.40	12,775
J10M	10	26	10.50	14	12.90	16,960
J12M	12	30	12.00	16	15.40	22,900
J14M	14	34	13.50	19	16.80	28,950
J16M	16	38	15.00	21	19.30	37,130

MATERIALS

Ball	Race	Liner
Low Carbon Steel Case Hardened Nickel Plated	Low Carbon Steel	Self Lubricated Thermo Plastic

P

Hard Plastic Body with Steel Ball Stud



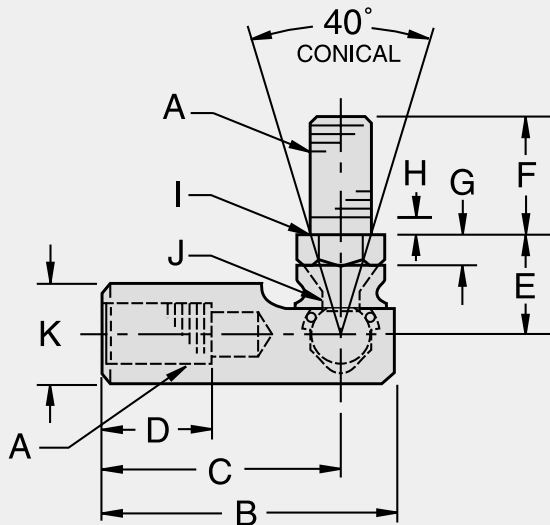
Part Number	A UNF	B ± .030	C ± .030	D REF 7/8	E ± .020	F ± .020	G REF	H REF	I REF	J REF	K REF	Ball Diameter REF
P103S	10-32	7/8	21/32	7/16	7/16	7/16	1/8	1/16	5/16	.125	5/16	.229
P103L	10-32	1-7/64	7/8	19/32	7/16	7/16	1/8	1/16	3/8	.156	5/16	.309
P107	1/4-28	1-7/64	7/8	3/8	7/16	9/16	1/8	1/16	3/8	.156	5/16	.309
P103BL*	10-32	-	-	-	7/16	7/16	1/8	1/16	3/8	.156	-	.309
P103HL**	10-32	1-7/64	7/8	19/32	-	-	-	-	-	-	5/16	-

* Ball Stud only
** Body only

MATERIALS	Ball Stud	Body
	Low Carbon Steel	Plastic
	Zinc Plated	Hard Thermo-Molded
	Yellow Dichromate Treated	Wear-Resistant

SR-G

Ball Joint with Rubber Grommet,
SAE J490/Type G/Style 4

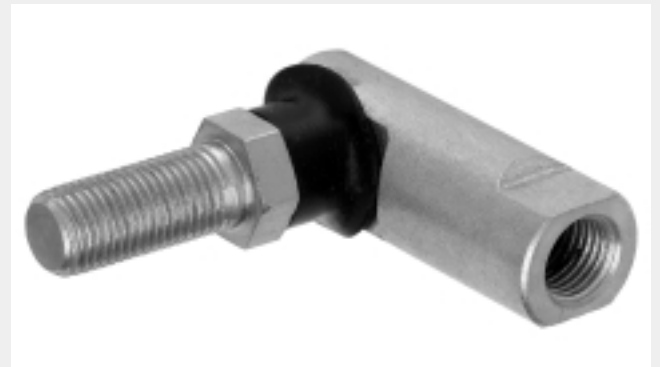
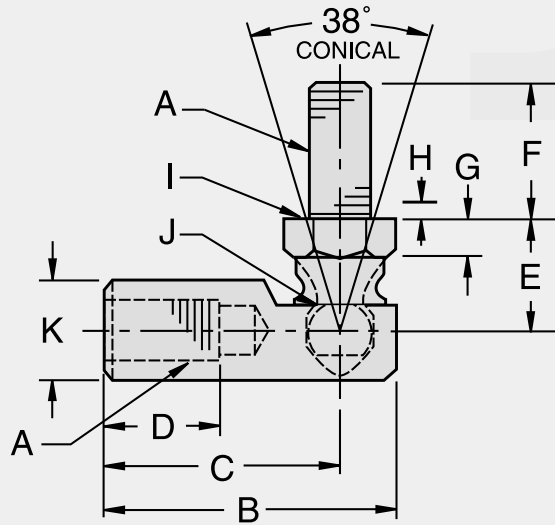


Part Number		A	B	C	D	E	F	G	H	I	J	K	W.F. Width	W.F. Length	Tensile & Shear Strength (Pounds)	Force to Remove Ball Stud (Pounds)
Right Hand	Left Hand	UNF	± .020	± .020	MIN	± .020	± .020	REF	REF	REF	REF	REF				
SR103G	SR103GLH	10-32	1-7/32	31/32	15/32	15/32	7/16	1/8	1/16	3/8	.217	7/16	3/8	9/32	420	1,400
SR107G	SR107GLH	1/4-28	1-7/32	31/32	17/32	15/32	9/16	1/8	1/16	3/8	.217	7/16	3/8	9/32	882	1,400
SR108G	SR108GLH	5/16-24	1-13/32	1-1/8	9/16	17/32	11/16	5/32	3/32	7/16	.232	1/2	7/16	9/32	1,375	1,575
SR109G	SR109GLH	3/8-24	1-11/16	1-3/8	3/4	11/16	7/8	3/16	3/32	1/2	.284	5/8	1/2	5/16	1,675	1,700
SR111G	SR111GLH	1/2-20	2-3/8	1-15/16	1-1/8	7/8	1-1/8	1/4	1/8	5/8	.382	3/4	5/8	3/8	2,637	2,855
SR112G	SR112GLH	5/8-18	2-37/64	2-1/16	1	1	1-1/8	5/16	1/8	3/4	.417	7/8	3/4	1/2	2,920	3,135

MATERIALS		
Ball Stud	Body	Retaining Ring
Low Carbon Steel	Low Carbon Steel	Galvanized Music Wire
Heat Treated	Heat Treated	Stress Relieved
Zinc Plated	Zinc Plated	
Yellow Dichromate Treated	Yellow Dichromate Treated	

R-G

Ball Joint with Rubber Grommet,
SAE J490/Type G/Style 2



Part Number		A	B	C	D	E	F	G	H	I	J	K	W.F. Width	W.F. Length	Tensile & Shear Strength (Pounds)	Force to Remove Ball Stud (Pounds)
Right Hand	Left Hand	UNF	± .020	± .020	MIN	± .020	± .020	REF	REF	REF	REF	REF				
R103G	R103GLH	10-32	1-1/16	7/8	7/16	7/16	7/16	1/8	1/16	5/16	.172	3/8	5/16	7/32	295	690
R107G	R107GLH	1/4-28	1-7/32	31/32	1/2	15/32	9/16	1/8	3/32	3/8	.193	7/16	3/8	9/32	882	1,005
R108G	R108GLH	5/16-24	1-13/32	1-1/8	9/16	17/32	11/16	5/32	3/32	7/16	.232	1/2	7/16	9/32	1,587	1,282
R109G	R109GLH	3/8-24	1-11/16	1-3/8	3/4	11/16	7/8	3/16	3/32	1/2	.287	5/8	1/2	5/16	2,437	1,900
I3-316	F58-11G	3/8-24	1-11/16	1-3/8	3/4	11/16	5/8	3/16	3/32	1/2	.287	5/8	1/2	5/16	2,437	1,900
R110G	R110GLH	7/16-20	2-3/8	1-15/16	1-1/8	7/8	1-1/8	1/4	1/8	5/8	.412	3/4	5/8	3/8	3,390	2,700
R111G	R111GLH	1/2-20	2-3/8	1-15/16	1-1/8	7/8	1-1/8	1/4	1/8	5/8	.412	3/4	5/8	3/8	3,390	2,700

MATERIALS

Ball Stud

Low Carbon Steel
Heat Treated
Zinc Plated
Yellow Dichromate Treated

Body

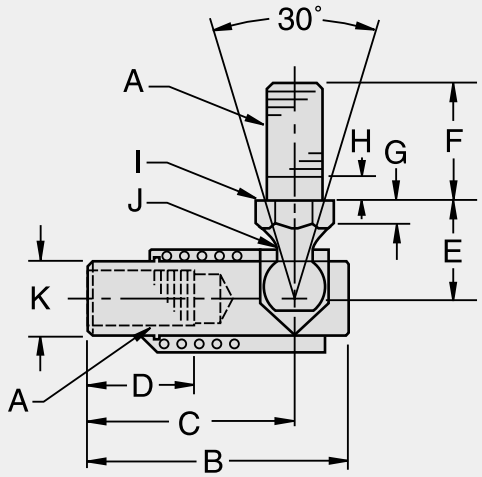
Low Carbon Steel
Zinc Plated
Yellow Dichromate Treated

NOTE:

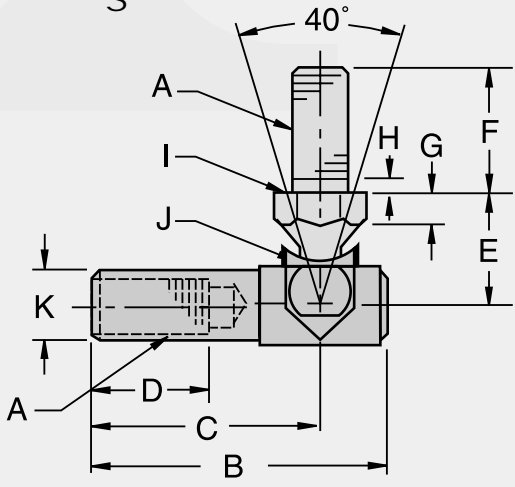
1. This series is also available in male to male and female to female configuration. Consult factory.

S/SC

Quick Disconnect with Spring or Spring Clip



(Type S)



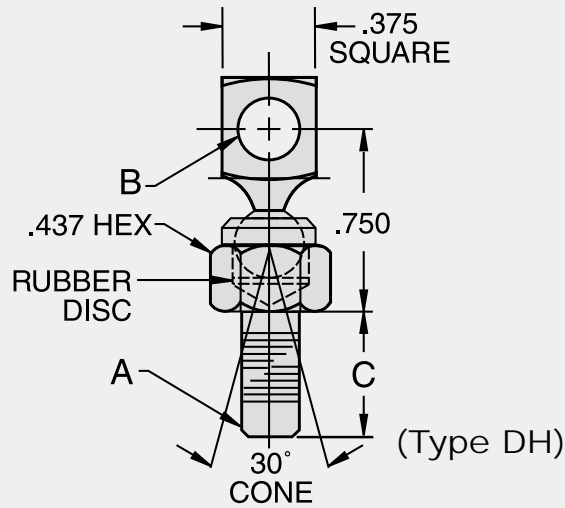
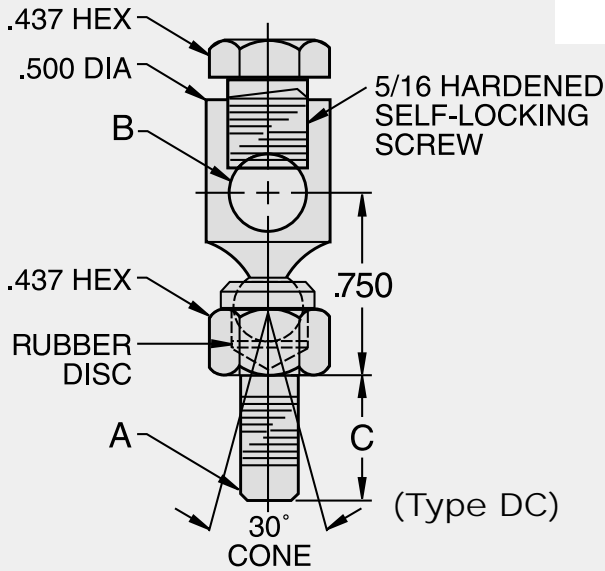
(Type SC)

Part Number	A	B	C	D	E	F	G	H	I	J	K	Ball Diameter REF
	UNF	± .020	± .020	MIN	± .020	± .020	REF	REF	REF	REF	REF	
S103	10-32	1-3/32	29/32	7/16	7/16	7/16	1/8	1/16	5/16	.171	5/16	.253
S107S	1/4-28	1-3/32	29/32	1/2	15/32	9/16	9/64	1/16	5/16	.171	5/16	.253
S108	5/16-24	1-9/16	1-1/4	9/16	35/64	11/16	5/32	3/32	7/16	.232	7/16	.341
S109	3/8-24	1-15/16	1-9/16	3/4	23/32	7/8	3/16	3/32	1/2	.287	9/16	.416
SC103	10-32	1-5/32	7/8	1/2	7/16	7/16	1/8	1/16	5/16	.125	5/16	.253
SC107	1/4-28	1-1/4	31/32	9/16	7/16	9/16	1/8	3/32	5/16	.125	5/16	.252

MATERIALS		
Ball Stud	Shell	Body
Low Carbon Steel	Low Carbon Steel	Low Carbon Steel
Heat Treated	Heat Treated	Zinc Plated
Zinc Plated	Zinc Plated	Yellow Dichromate Treated
Yellow Dichromate Treated	Yellow Dichromate Treated	

DC/DH

Control Swivels



Part Number		B +.005 -.002	C ±.015	A	Weight Less Integral Nut & Washer (Pounds)	Weight With Integral Nut & Washer (Pounds)
Less Integral Nut & Washer	With Integral Nut & Washer	Bore Diameter	Shank	Thread Size & Length		
DC1005F	DC1005FN	.328	.312	10-32 x .250	.047	.050
DC1207F	DC1207FN	.328	.437	1/4-28 x .328	.050	.057
DC1209F	DC1209FN	.328	.562	1/4-28 x .500	.052	.058
DC1207C	DC1207CN	.328	.437	1/4-20 x .328	.049	.056
DC1209C	DC1209CN	.328	.562	1/4-20 x .453	.051	.057
DC1310F	DC1310FN	.328	.625	5/16-24 x .516	.056	.067
DC1312F	DC1312FN	.328	.750	5/16-24 x .641	.059	.070
DH1209F-2		.257	.562	1/4-28 x .500	.035	
DH1207F-2		.257	.437	1/4-28 x .328	.033	

MATERIALS

Ball Joint

Made of low carbon steel, zinc plated and dichromate treated for corrosion resistance. A Buna N rubber disc provides smooth, vibration-free operation.

Integral Lock Washer and Nut

Available as an optional extra.

Special Set Screws

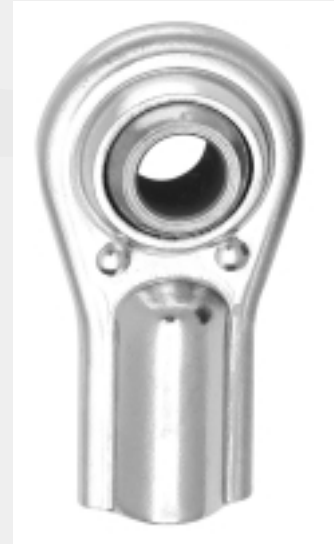
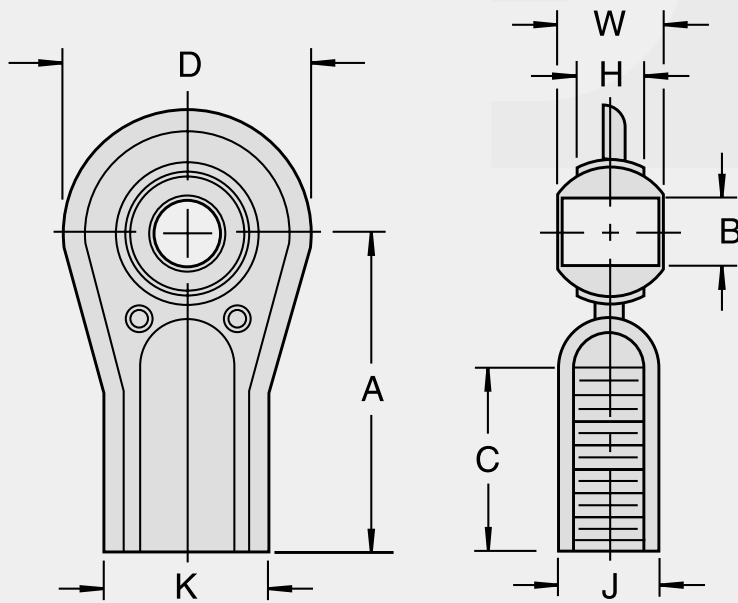
Set screws used in TLG's damper control swivels are a self-locking design that provides increased holding strength. DC set screws are surface hardened for wear resistance.

NOTES:

1. These swivels can be used with either 1/4" or 5/16" diameter control rods.

FSF

Stamped Steel Housing, 2-Piece,
Metal to Metal



Part Number		B +0.002 -0.000	W ±.005	A +0.062 -0.031	D ±.030	K ±.030	+0.000 -0.002	C ±.040	J ±.030	H REF	
Right Hand	Left Hand	Ball Bore	Ball Width	Centerline Length	Head Diameter	Shank Width	Ball Diameter	Thread Length	Thread Size	Shank Thickness	Housing Width
FSF6	FSFL6	.375	.500	1.625	1.150	.760	.719	.812	3/8-24	.485	.375

MATERIALS

Ball

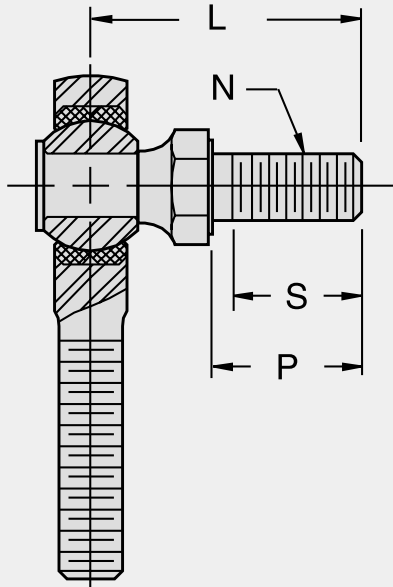
Low carbon steel
Case hardened
Zinc plated
Dichromate treated

Body

Heavy gauge low carbon steel,
zinc plated and
chromate treated for corrosion
resistance.

Bearing Options

Factory Installed Studs and Lubrication Fittings



Rod End Bore Size	L REF	P ± .030	S Min. Thread Length	N Thread Size UNF-2A
3/16"	.875	.438	.375	10-32
1/4"	1.032	.563	.500	1/4-28
5/16"	1.220	.688	.594	5/16-24
3/8"	1.500	.875	.781	3/8-24
7/16"	1.906	1.062	.937	7/16-20
1/2"	2.000	1.125	1.000	1/2-20
5/8"	2.500	1.500	1.375	5/8-18
3/4"	3.000	1.812	1.625	3/4-16

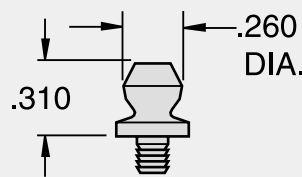
Available on designated series. To specify standard stud, add suffix "S".
Example: MSF8S

NOTES:

1. Material: Low carbon steel, zinc plated, dichromate treated.
2. Misalignment is plus/minus 25 degrees (approx.) in any direction.

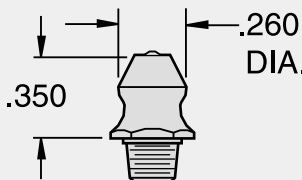


Standard zerk locations on male and female rod ends.



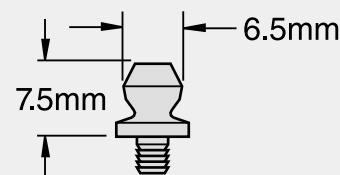
Standard Drive Fit Zerk

Specify by adding suffix "Z" to part number.
Example: MSF8Z



Standard Threaded Zerk

Specify by adding suffix "-28" to part number.
Example: MSF8Z-28



Metric Zerk

Specify by adding suffix "ZM" to part number.
Example: MSF8ZM

Technical Information

TLG's engineering staff possesses the expertise to provide advice and guidelines regarding nearly all motion transmission applications.

There are several factors pertaining to engineering application, including correct installation, that should be taken into consideration to insure optimum performance of your chosen linkage components.

1) When mounting ball studs, the hex mounting portion should be properly tightened and flat against its mating surface. Adequate countersinks, counterbores or washers may be necessary to provide a tight, flush joint.

Installation torque values for tightening must be within the capacity of the linkage component or breakage may occur from over-tightening. Consult with the TLG engineering staff, or refer to an appropriate engineering standard mounting nut torque values associated with each grade of threaded fastener. Looseness in the threaded joint or mounting surface may cause abnormal wear and early failure of the linkage component.

2) When mounting rod ends, care should be used in tightening a fastener against the ball to prevent distortion. The same torque requirements that apply to threaded fasteners also apply to securing the rod end spherical ball. The plated ball may become chipped or distorted by excessive clamping pressure, resulting in increased torque, wear, and premature failure of the rod end.

3) In applications involving vibration where loosening of the linkage components may occur, self locking nuts or lockwashers should be used to secure the components

and prevent loosening. Looseness in the threaded joint or mounting surface may cause abnormal wear and early failure of the linkage component.

4) Ball joints and rod end bearings should be mounted in such a way as to best utilize the design of the joint with respect to gravitational force, for example, a ball joint should be mounted with the housing member on top of the ball stud. Mounting the housing component so that the weight of it and the linkage are hanging from the ball or ball stud could accelerate wear and lead to detachment of linkage components and sudden loss of control.

5) It is recommended that a separate stop be incorporated in the linkage system to eliminate the possibility of exceeding the misalignment capability of the ball joint or rod end bearing. An overtravel condition of this type may result in breakage and detachment of the ball joint or rod end components and sudden loss of control.

6) TLG ball joints and rod end bearings are manufactured to commercial standards. If you have questions concerning a particular product for your application, TLG can offer assistance; however, it is your responsibility to determine if the part you chose will be suitable for a specific application. *This is especially true in applications where safety is a factor.*

7) To determine a part's useful life for a particular application, you should test sample parts under actual operating conditions.

Installation of Spherical Bearing

Proper installation of the bearing is important to prevent bearing failure as well as housing damage. Under no circumstances should a tool that induces shock or impact to the bearing be used. The use of an arbor press or hydraulic press is recommended. A tool as shown below (Figure 1) is advised. All force is to be applied on bearing race face (not on ball). A lead chamfer or radius on the bearing and/or housing is vital.

Ultimate Radial Static Load Capacity (Rod Ends)

These loads are the maximum amount of force the part can sustain before complete failure. All loads listed in the catalog are based on rod ends without grease fittings. Due to the removal of material for the fitting, the load rating for

such a part is substantially lower. Consult TLG engineering for assistance on these parts.

Radial Static Load Capacity (Spherical Bearings)

These loads are the maximum amount of force the part can sustain before a 2% permanent set occurs in the part. Consult TLG engineering if these numbers don't fit your application.

Static Limit Load (Spherical Bearings)

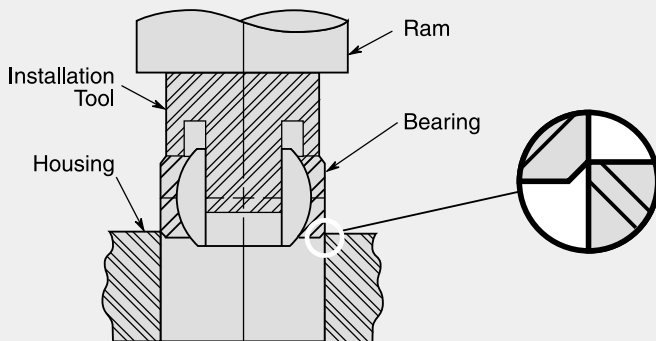
Static limit load is the allowable load that can be applied to a bearing without adversely affecting its performance capabilities.

Housing Bore for Press Fit of Spherical Bearings

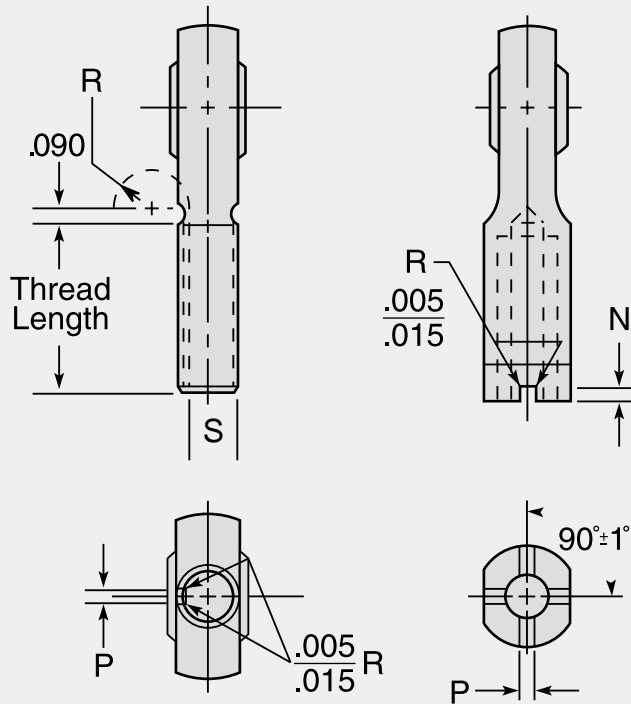
D BEARING DIAMETER +.0000 -.0005	Housing Bore			
	STEEL		ALUMINUM	
	MAX.	MIN.	MAX.	MIN.
.6250	.6245	.6241	.6244	.6239
.7500	.7495	.7491	.7494	.7489
.8750	.8745	.8741	.8744	.8739
1.0000	.9995	.9991	.9994	.9989
1.1875	1.1870	1.1865	1.1869	1.1863
1.3125	1.3120	1.3115	1.3119	1.3113
1.5625	1.5620	1.5613	1.5619	1.5611
2.2500	2.2495	2.2488	2.2494	2.2486
2.3750	2.3745	2.3738	2.3744	2.3736
2.6250	2.6245	2.6238	2.6244	2.6236
3.2500	3.2495	3.2488	3.2494	3.2486
4.0000	3.9995	3.9988	3.9994	3.9986

D BEARING DIAMETER +.0000 -.0005	Housing Bore			
	STEEL		ALUMINUM	
	MAX.	MIN.	MAX.	MIN.
.4687	.4682	.4678	.4681	.4676
.5625	.5620	.5616	.5619	.5614
.6562	.6557	.6553	.6556	.6551
.7500	.7495	.7491	.7494	.7489
.8125	.8120	.8116	.8119	.8114
.9062	.9057	.9053	.9056	.9051
1.0000	.9995	.9991	.9994	.9989
1.0937	1.0932	1.0928	1.0931	1.0926
1.1875	1.1870	1.1866	1.1869	1.1864
1.4375	1.4370	1.4366	1.4369	1.4364
1.5625	1.5620	1.5616	1.5619	1.5614
1.7500	1.7495	1.7491	1.7494	1.7489

Figure 1



Rod End Keyway (Ref NAS 559)



Dimensions in Inches

THREAD OD REF	N MAX.	P MIN.	N MAX.	P MIN.
.2500	.056	.062	.201	.255
.3125	.056	.062	.260	.255
.3750	.056	.093	.311	.255
.4375	.069	.093	.370	.255
.5000	.069	.093	.436	.255
.5620	.077	.125	.478	.255
.6250	.077	.125	.541	.255
.7500	.077	.125	.663	.255
.8750	.086	.156	.777	.318
1.0000	.094	.156	.900	.318
1.1250	.094	.094	1.010	.382
1.2500	.116	.187	1.136	.382
1.3750	.116	.187	1.236	.445
1.5000	.116	.250	1.361	.445
1.6250	.129	.250	1.477	.445
1.7500	.129	.250	1.589	.508
1.8750	.129	.312	1.714	.508
2.0000	.129	.312	1.839	.508
2.1250	.129	.312	1.955	.508
2.2500	.129	.312	2.080	.508

WARNING!

Since the manufacturer is unable to determine all applications in which a part may be placed, it is the user's responsibility to determine the suitability of the part for its intended use. This is especially true where safety is a factor.

Incorrect application or installation may result in property damage, bodily injury, or death. For technical assistance, call 219-749-5105.

Calculations for
Misalignment of Rod End
& Spherical Bearings

B = Bore of ball

C = Chamfer on outer race

D = Head diameter or diameter of outer race

E = Ball diameter

H = Housing width

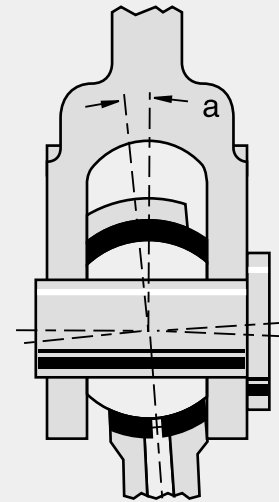
$$V = \sqrt{(D - 2C)^2 + H^2}$$

W = Ball width

The angle of misalignment in a rod end is controlled by the outside diameter of the head. The maximum degree of misalignment is obtained when the head contacts the side of the fork or clevis in which it is mounted.

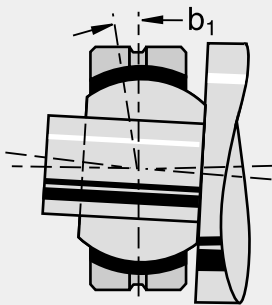
The angle of misalignment in a spherical bearing is calculated somewhat differently from that of the rod end because the housing is not spherical. There are three different types of mountings in which these bearings may be used as shown, and the angle of misalignment is governed by the type of mounting adopted.

Shown below are the common mountings for spherical bearings and the corresponding formula for calculating the angle of misalignment.

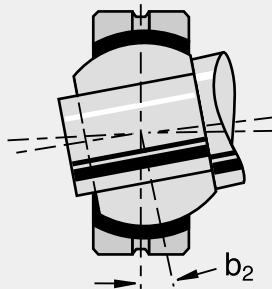


Rod End Angle:

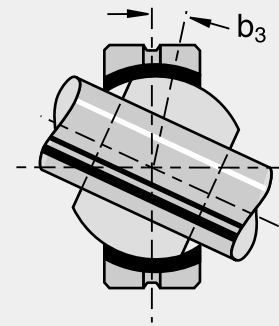
$$a = \text{SIN}^{-1} \frac{W}{D} - \text{SIN}^{-1} \frac{H}{D}$$



$$b_1 = \text{SIN}^{-1} \frac{W}{V} - \text{SIN}^{-1} \frac{H}{V}$$



$$b_1 = \text{SIN}^{-1} \frac{W}{E} - \text{SIN}^{-1} \frac{H}{E}$$



$$b_1 = \text{SIN}^{-1} \frac{B}{E} - \text{SIN}^{-1} \frac{B}{E}$$



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